Nacho Family Service Manual

UPDATES

07-February-2005: Light Tunnel (315-0053-xx) added as a replaceable part in service manual.

26-October-2004: Color wheel assembly (525-0139-xx) added as a replaceable part in service manual.

The Nacho family of projectors includes the ASK Proxima C170 and the InFocus LP600.

Using the manual

The bookmarks that appear on the side of the screen help you navigate to each topic in the manual. You can use them to quickly go from a troubleshooting topic to instructions to remove a specific part.

There is also a Table of Contents and page references should you need to work with a printed document.

The manual is arranged in the order you can use to diagnose and then repair the projector. The three main sections of the service manual are:

Troubleshooting—In this section, you will find troubleshooting flowcharts for a variety of symptoms. The flowcharts lead you through power and image diagnostics, as well as audio, keypad and remote issues. There are also controller and I/O ECA diagram, and image banding adjustment instructions.

Parts Removal and Replacement—Instructions to remove and replace each FRU in the projector. We've also included a removable parts hierarchy you can use to see what parts must be removed to access each FRU in the projector. You can also refer to the Illustrated Replaceable Parts List in the Parts Lists.

Parts Lists—In this section are the illustrated replaceable parts list and the exploded view.

For specifications, firmware updates and instructions, and current field communications, see your online ASC Resource Center.

Table of Contents

Troubleshooting

You use the Troubleshooting section to diagnose problems with the projector. In this section, you will find troubleshooting flowcharts for a variety of symptoms. Each flowchart leads you through a series of steps that will ultimately result in a solution. The solutions begin with the most simple and progress to the most complex.

On the left, select the section you want.

Power problems, including lamp issues, partial power up, shutdown and no power

Image problems, including no image, bad color, dim image and other picture distortions

Keypad problems

Remote problems

Audio problems

In addition to the troubleshooting trees, you will also find a **controller voltage diagram**.

Power and Start-up Problems

The projector communicates its status via an LED located on the keypad. When this status LED is green, you know that the projector is working properly. When the status LED is solid red or flashing red, you know there are lamp, power or startup problems. The frequency with which the status indicator blinks red indicates one of several error codes. These error codes provide crucial information about projector malfunctions. In addition, this projector includes an LCD message that provides you with additional information.
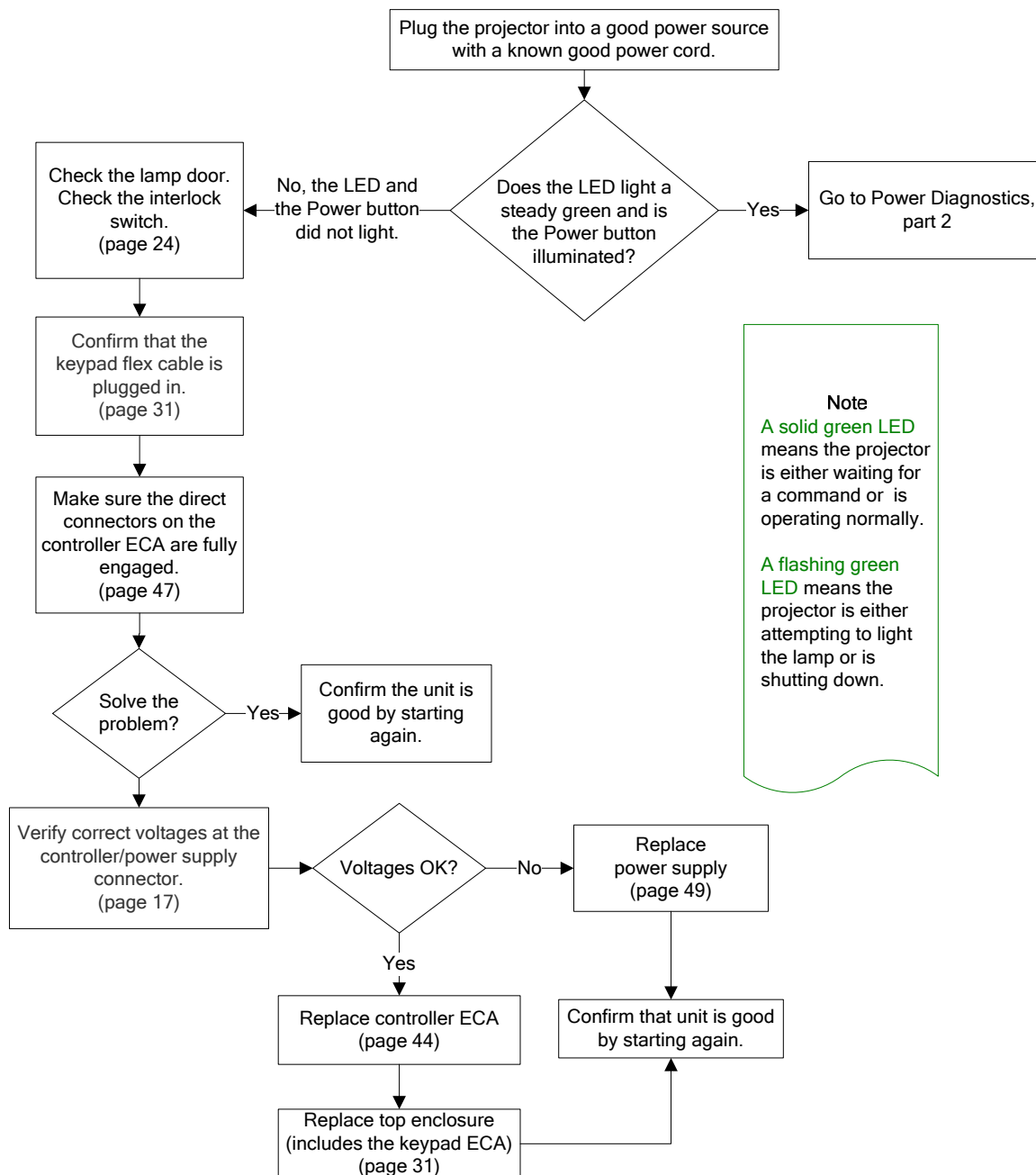

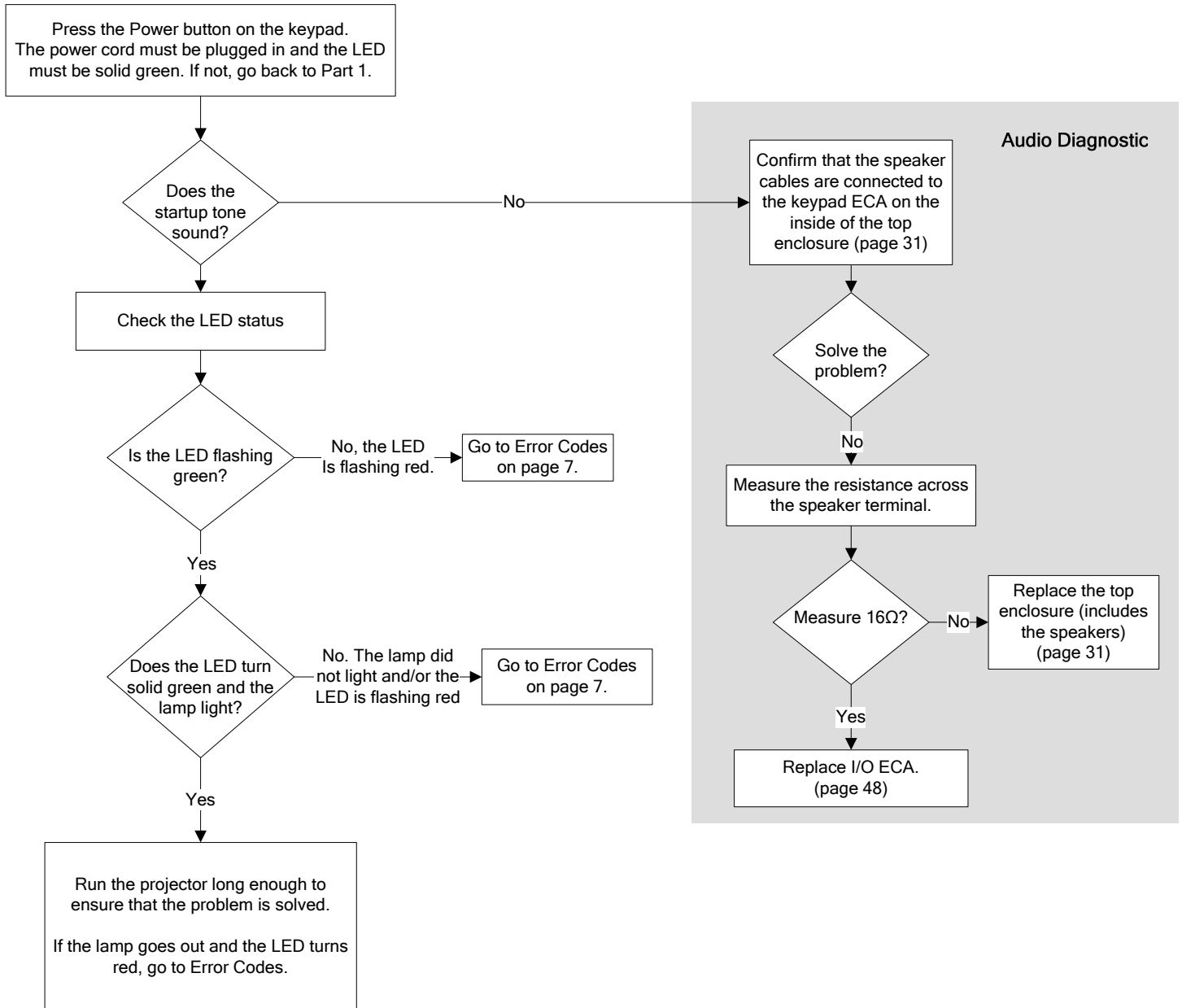The power diagnosis sequence begins on the next page.

NOTE We **strongly** suggest that you follow the entire power diagnosis sequence, which begins on the next page.
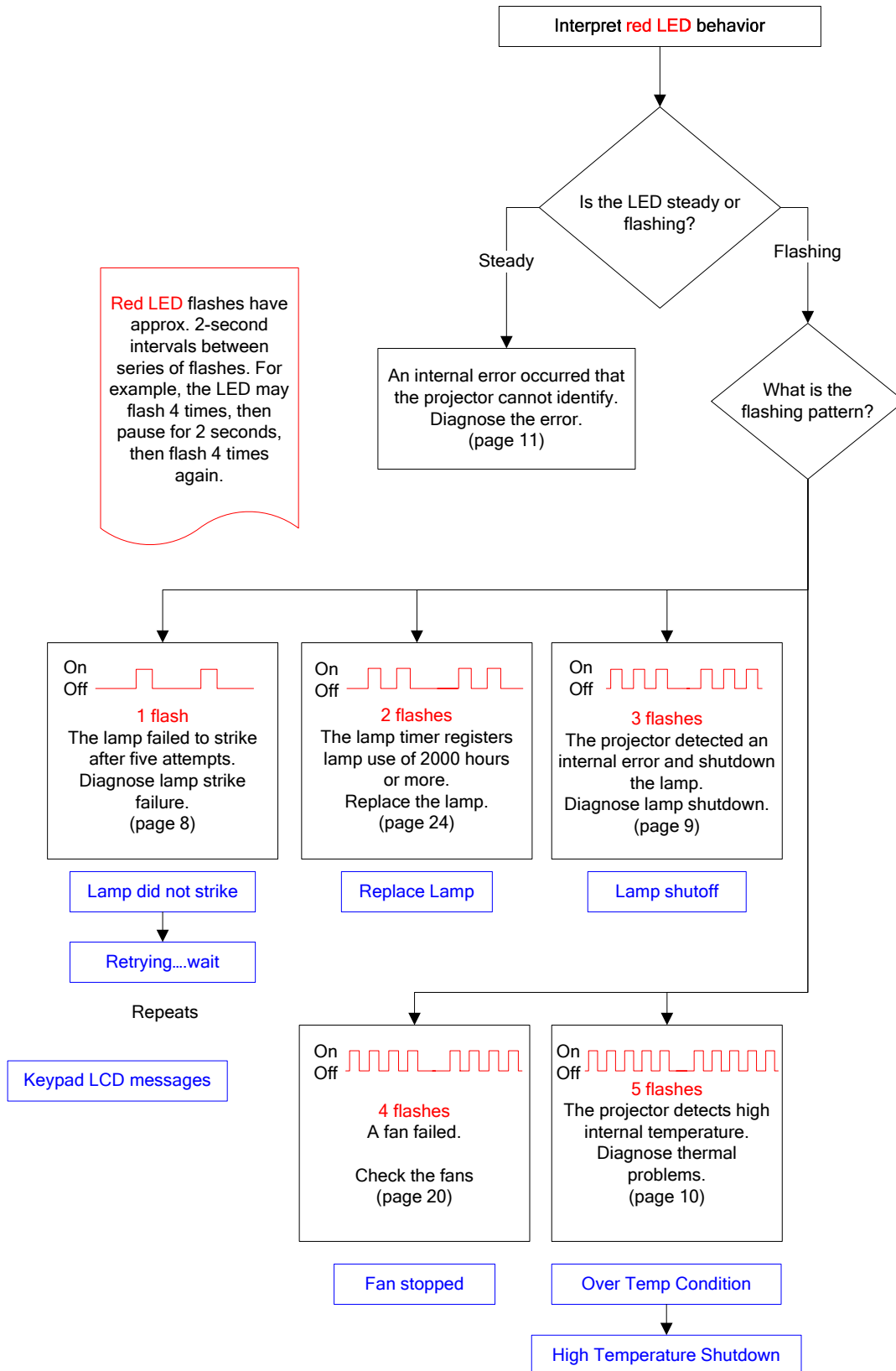
LED Status	Projector Status	LCD Message
LED flashes green	The projector is starting up after the Power button was pressed, or the projector is shutting down after the Power button was pressed.	POWER UP. WAIT…X SEC Or POWER DOWN. WAIT…X SEC
LED is solid green	The projector is ready to light the lamp when the Power button is pressed. Or the lamp is lit and the projector is operating properly.	Various messages, including feedback for keypad button presses.
LED flashes red once	The lamp will not strike after five tries.	LAMP WON'T STRIKE RETRYING WAIT
LED flashes red two times	The lamp has more than 2,000 hours of use. Requires replacement. Projector shuts down.	REPLACE LAMP
LED flashes red three times	Lamp failure. Projector shuts down.	LAMP FAILURE
LED flashes red four times	A fan has failed. Projector shuts down.	FAN FAILURE SHUTDOWN 10….(counts down; shuts down after 1)
LED flashes red five times	The projector is overheating. Check for a blocked vent.	HIGH TEMPERATURE SHUTOFF
LED is solid red	Undiagnosed error. Projector shuts down.	

Power Diagnostics, part 1

Plug the projector into a good power source with a known good power cord.

Does the LED light a steady green and is the Power button illuminated?

No, the LED and the Power button did not light. → Check the lamp door. Check the interlock switch. (page 24)

Yes → Go to Power Diagnostics, part 2

Confirm that the keypad flex cable is plugged in. (page 31)

Make sure the direct connectors on the controller ECA are fully engaged. (page 47)

Solve the problem?

Yes → Confirm the unit is good by starting again.

Verify correct voltages at the controller/power supply connector. (page 17)

Voltages OK?

No → Replace power supply (page 49)

Yes

Replace controller ECA (page 44)

Replace top enclosure (includes the keypad ECA) (page 31)

Confirm that unit is good by starting again.

Note
A solid green LED means the projector is either waiting for a command or is operating normally.

A flashing green LED means the projector is either attempting to light the lamp or is shutting down.

Power Diagnostics, part 2

Press the Power button on the keypad. The power cord must be plugged in and the LED must be solid green. If not, go back to Part 1.

Does the startup tone sound?

No → Confirm that the speaker cables are connected to the keypad ECA on the inside of the top enclosure (page 31)

Audio Diagnostic

Check the LED status

Is the LED flashing green?

No, the LED Is flashing red. → Go to Error Codes on page 7.

Yes

Does the LED turn solid green and the lamp light?

No. The lamp did not light and/or the LED is flashing red → Go to Error Codes on page 7.

Yes

Run the projector long enough to ensure that the problem is solved.

If the lamp goes out and the LED turns red, go to Error Codes.

Solve the problem?

No

Measure the resistance across the speaker terminal.

Measure 16Ω?

No → Replace the top enclosure (includes the speakers) (page 31)

Yes

Replace I/O ECA. (page 48)

Power Diagnostics, Error Codes

Interpret red LED behavior

Is the LED steady or flashing?

Steady

Flashing

Red LED flashes have approx. 2-second intervals between series of flashes. For example, the LED may flash 4 times, then pause for 2 seconds, then flash 4 times again.

An internal error occurred that the projector cannot identify. Diagnose the error. (page 11)

What is the flashing pattern?

On
Off

1 flash
The lamp failed to strike after five attempts. Diagnose lamp strike failure. (page 8)

Lamp did not strike

Retrying....wait

Repeats

Keypad LCD messages

On
Off

2 flashes
The lamp timer registers lamp use of 2000 hours or more. Replace the lamp. (page 24)

Replace Lamp

On
Off

3 flashes
The projector detected an internal error and shutdown the lamp. Diagnose lamp shutdown. (page 9)

Lamp shutoff

On
Off

4 flashes
A fan failed.

Check the fans (page 20)

Fan stopped

On
Off

5 flashes
The projector detects high internal temperature. Diagnose thermal problems. (page 10)

Over Temp Condition

High Temperature Shutdown

LED flashes single red

The lamp won't strike after five attempts. The status LED flashes a repeated red single-flash sequence.

Ensure that the lamp is good.

Is the lamp door closed? —No→ Close the door properly and restart diagnostics

LCD Message

Lamp did not strike

↓

Retrying, wait...

Repeats

Yes

Open the lamp door. Check the interlock switch. (page 24)

Interlock switch good? —No→ Replace the exhaust fan assembly (includes the interlock switch). (page 37)

↓

Restart the diagnostic process.

Yes

Make sure lamp connector securely attached to lamp cable (page 24)

Replace power supply. (page 49) ←No— Voltages good at power supply/controller connector? (page 15)

Yes

Yes← Problem solved? —No→ Replace color wheel assembly. (page 40)

↓

Replace the controller ECA. (page 44)

Verify the repair by restarting the Power Diagnosis process.

LED repeats 3 flash sequence

LCD Message

Lamp shutoff

The lamp was operating but shut down. Fans are running. The status LED flashes a repeated red three-flash sequence.

Note
If the projector is operated in a hot environment, especially at high altitudes, the unit may overheat and shut down when the thermal switch opens. The only solution for this is to let the projector cool down. The projector should not be used where ambient temperatures are over 95º F (35º C).

Reinstall the lamp, ensuring that it is properly seated.

Solve the problem?

Yes → Run the projector long enough to ensure that the problem is solved.

No

Replace the power supply. (page 49)

Yes

Repeat the diagnostic process to ensure that the problem is solved.

LED repeats 5 flash sequence

Projector shuts down after detecting high temperature condition. LED flashes in repeated five-flash sequence.

LCD Messages

High temperature shutdown

Verify that the two exhaust fans are operating. These fans are not sensed. (page 20)

Are both fans turning? — No → Remove the top case (page 31), then check the fan voltages (page 21). If the voltages are good, replace the exhaust fan assembly (page 37). If the voltages are bad, replace the controller ECA. (page 44)

Run the projector long enough to confirm the problem issolved. Repeat the diagnosis process.

Yes

Check the thermal switch on the lamp housing. Measure the resistance at the switch (page 19). If the resistance is infinity (open), the thermal switch is bad.

Is the thermal switch good? — No → Replace the exhaust fan assembly. The thermal switch is part of the assembly. (page 37)

Yes

Substitute a good power supply and run projector long enough to know if that is the problem.

Solve the problem? — No → Replace controller ECA. (page 40)

Yes

Run the projector long enough to confirm the problem issolved. Repeat the diagnosis process.

LED is solid red

LED solid red.
Fans may or may not be running.

Power supply voltages good? (except lamp enable) (page 15)

Replace the power supply. (page 52) ← No

Yes

Is the color wheel spinning?

Reseat color wheel cable. ← No

Yes

If color wheel does not spin, replace the color wheel assembly. (page 40)

Replace the controller ECA. (page 44)

Does the color wheel start and the lamp light?

Replace the controller ECA. (page 44) ← No

Yes

To confirm that the problem is solved, restart the diagnosis process. (page 5)

Image Problems

The image is not correct.
The projector starts and runs normally.
The menus are accessible. The lamp is lit.

Confirm that the cables and the source signals are good. Make sure the signal is good.

Confirm that all image adjustments are set to the factory defaults. Select Factory Reset from the Settings > Service menu.

Flash the projector with the latest software.

What is the problem?

No video image

Replace the I/O ECA
(page 44)

Replace the controller ECA
(page 44)

Replace the optical engine
(page 48)

No computer image. Vertical or horizontal lines. Sparkly picture. Clusters of dark pixels.

Replace the controller ECA
(page 44)

Replace the optical engine
(page 52)

Bad or missing tint or color Missing logo, VGA, composite video, or S-video Distorted image, noisy, rolling, torn, frozen, 'plaid', repeated, or shifted image

Replace the color wheel assembly.
(page 40)

Replace the controller ECA.
(page 44)

Dim image

Substitute known good lamp

Substitute a known good controller ECA.
(page 44)

Replace the optical engine.
(page 52)

Image banding

Adjust the horizontal or vertical banding
(page 17)

Replace the light tunnel
(page 58)

Replace the optical engine.
(page 52)

Keypad Problems

Keypad does not respond to key presses

Does the remote control work?

Yes → Replace the top enclosure (includes the keypad ECA) (page 31)

No → Replace controller ECA (page 44)

There are IR receivers on the rear, front and both sides of the projector. Make sure you try the remote through at least two IR receivers. If one or more IR receivers do not work, go to Remote problems on page 14.

LCD Problems

LCD messages do not appear

Unplug the projector from the power source, then plug it in again. Power it up.

Replace the top enclosure (includes keypad ECA) (page 31)

Replace controller ECA (page 44)

Remote Problems

```
┌─────────────────────────────────────────┐
│         Infrared remote problem          │
└─────────────────────────────────────────┘
                    │
                    ▼
┌─────────────────────────────────────────┐
│   Use known good batteries in the remote. │
└─────────────────────────────────────────┘
                    │
                    ▼
┌─────────────────────────────────────────┐
│            Replace the remote.            │
└─────────────────────────────────────────┘
                    │
                    ▼
┌─────────────────────────────────────────────────────┐
│ Aim the remote at each of the IR receivers on the    │
│ projector. There are IR receivers on all four sides  │
│ of the projector. Issue a remote command to each     │
│ receiver.                                            │
└─────────────────────────────────────────────────────┘
```

Confim that environmental factors are not interfering with the remote. Florescent lights, harsh sunlight and other IR sources can cause poor remote response.

```
┌──────────────────────┐  ┌──────────────────────┐  ┌──────────────────────┐
│ Responds to all      │  │ Does not respond to  │  │ Does not respond to  │
│ receivers except     │  │ any receivers, OR    │  │ f the side IR        │
│ REAR receiver.       │  │ responds to all      │  │ receiver located     │
│                      │  │ receivers except the │  │ adjacent to the      │
│                      │  │ side IR receiver     │  │ exhaust fans OR to   │
│                      │  │ located on the       │  │ the front IR         │
│                      │  │ intake bezel.        │  │ receiver.            │
└──────────────────────┘  └──────────────────────┘  └──────────────────────┘
          │                                                   │
          ▼                                                   ▼
┌──────────────────────┐                        ┌──────────────────────┐
│ Replace the I/O ECA  │                        │ Remove the top case  │
│ (page 44)            │                        │ (page 31). Ensure    │
│                      │                        │ that the IR cable is │
│                      │                        │ plugged into the I/O │
│                      │                        │ ECA. (page 37)       │
└──────────────────────┘                        └──────────────────────┘
                                                           │
                        ┌──────────────────────┐           ▼
                        │ Replace controller   │  ┌──────────────────────┐
                        │ ECA        ◄─────────┼──┤ Replace the exhaust  │
                        │ (page 44)            │  │ fan assembly         │
                        │                      │  │ (includes the side   │
                        │                      │  │ IR) (page 37)        │
                        └──────────────────────┘  └──────────────────────┘
```

Check Controller ECA and I/O Voltages

1 Remove the top case.

2 Plug the projector into a power source.

You can measure 'non-power state' voltages on the controller ECA when the projector is not powered up.

3 Use the remote control to power up the projector.

NOTE If you don't have a remote control, you can plug the keypad cable into its connector on the controller ECA, and use the power button on the keypad.

4 Use measurement equipment to check the controller ECA for voltages.

Pin	Voltage
1	5v
2	0-5v when hub sensor signal received
3	0.0v

Lamp blower

Color wheel sync cable

Left IR receiver

Pin	Voltage
1	0-5v when IR signal received
2	0v
3	5v

Pin	Voltage
1	0-5v when operating properly
2	0.0v (good), 3.3v (bad)
3	0.0v
4	0.0v

Keypad cable

Controller/IO cable

Controller/power supply connector

Pin	Voltage
1	1.5v
2	12.0v
3	1.5v
4	5.0v
5	3.3v
6	0.0v
7	0.0v
8	0.0v
9	0.0v
10	0.0v
11	0.0v
12	0.0v
13	0.0v
14	3.2v
15	3.2v (goes to 0v when lamp lights)

5 Check the voltages on the I/O ECA.

Front & Right IR

Pin	Voltage
1	5v
2	0-5v when IR signal received
3	0.0v

Fans

Pin	Voltage
1	0-5v
2	0v

Controller/IO cable

2 1 3 1 4 1
40mm fan   Front and right IR
  60mm fan

Rear IR

3 1

Rear IR

Pin	Voltage
1	0-5v
2	0v
3	5v
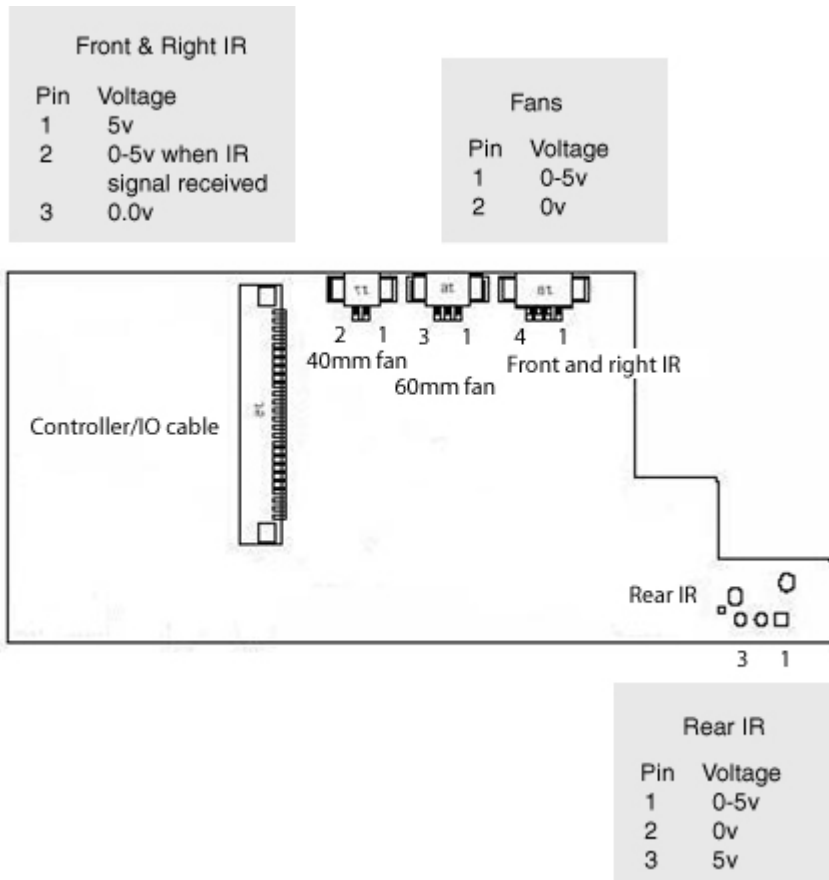
Adjust Image Banding

Image banding can appear on the top, bottom, right or left sides of the projected image. Banding occurs when a portion of the picture that is normally masked appears on the screen. This occasionally happens during shipping or handling. This model allows adjustments for banding on any side of the image. Banding examples are circled in the images below.

NOTE If this adjustment does not resolve the issue, the issue may lie with the light tunnel. See page 58 for information about the light tunnel.
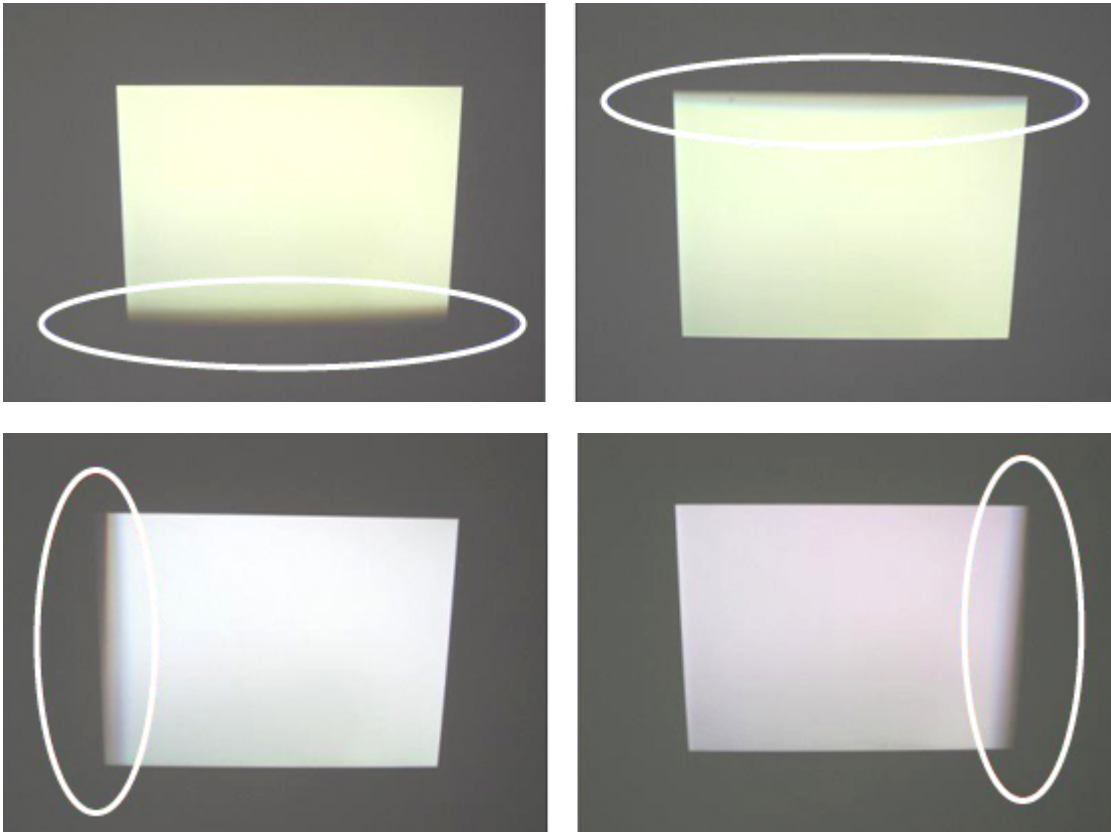
To adjust banding, do the following.

1. Turn the projector upside down on the work surface and remove the lamp door.
2. Defeat the interlock switch with a piece of flexible plastic.
3. Power up the projector and project a plain white or gray image on the screen.

4 To adjust banding on the top or bottom of the image, use a T6 driver to turn the adjustment screw in the hole shown below. Turn clockwise or counterclockwise until the top and bottom of the image are even.

Adjust vertical banding here.

Interlock switch defeated
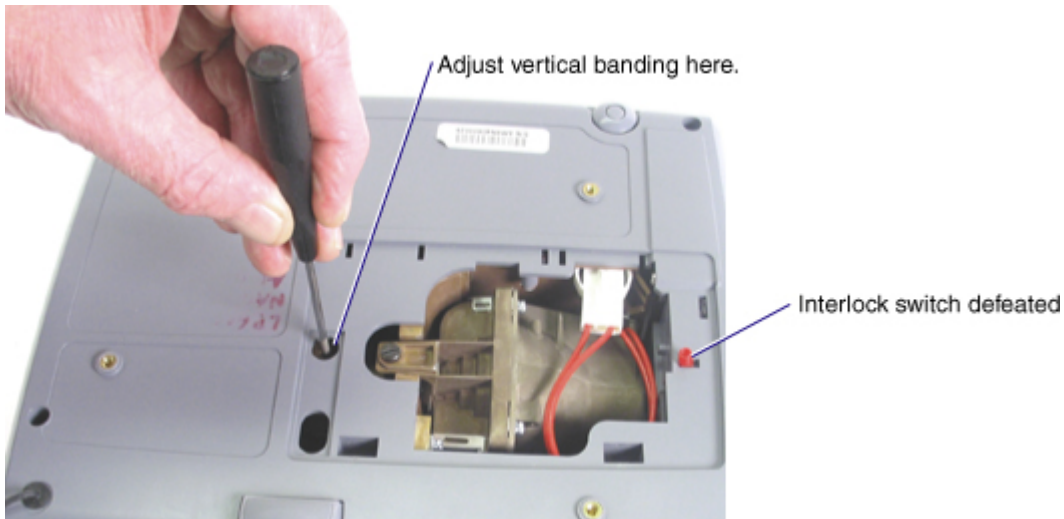
5 To adjust banding on the right or left side of the image, use the T6 driver to turn the adjustment screw in the hole shown below. Note that you must insert the driver at an angle to engage the screw head. Turn clockwise or counterclockwise until the top and bottom of the image are even.

Adjust horizontal banding here.

Interlock switch defeated
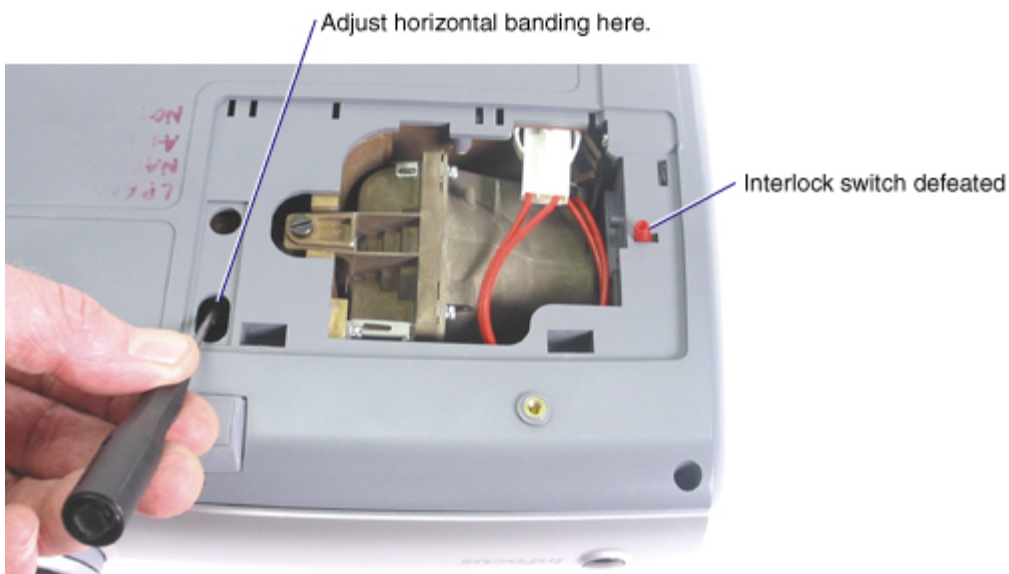
6 When you finish the adjustment, power down the projector, and remove the plastic from the interlock cavity. Install the lamp door and project an image to confirm that banding is no longer present.

7 If you cannot adjust out the banding, the optical engine requires replacement (page 52).

Check the Thermal Switch

The thermal switch is designed to open when the temperature inside the projector gets too high. When the switch opens, the power supply shuts down, turning the projector off.

When the projector shuts down after operating for a few minutes or when the lamp fails to strike after repeated attempts at startup, check the thermal switch.

1 Power up the projector.

2 Let the projector run until it shuts down.

3 Remove the top enclosure (page 31).

4 Lift the side IR ECA out its mount on the exhaust fan bracket. This allows you to access the thermal switch.
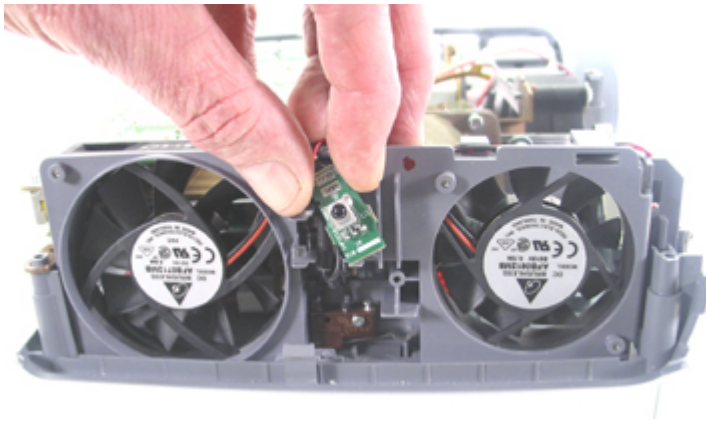
5 Measure the resistance across the terminals at the thermal switch. If the resistance is **infinite** (Ω), replace the exhaust fan assembly, which includes the thermal switch (page 37).
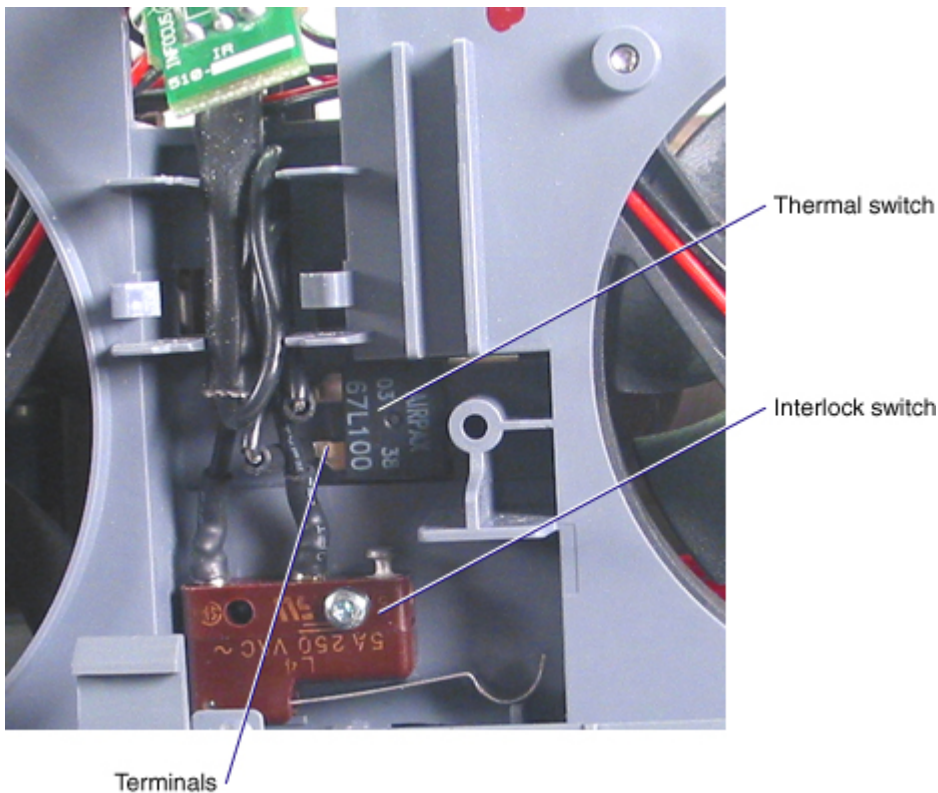
Check fan operation

Exhaust fans

The two **exhaust fans** are not three wire fans. Thus, if either or both stops working, the four-flash red LED error code will not appear. It is more likely that the projector will overheat or will be noisier. The noise level would rise when one exhaust fan stopped working and the other ran at high speed to compensate. The projector may not shut down and the fan error may not appear if the single exhaust fan can keep the temperature below the critical level.

Observe the lamp blower from this angle.

Exhaust fan assembly
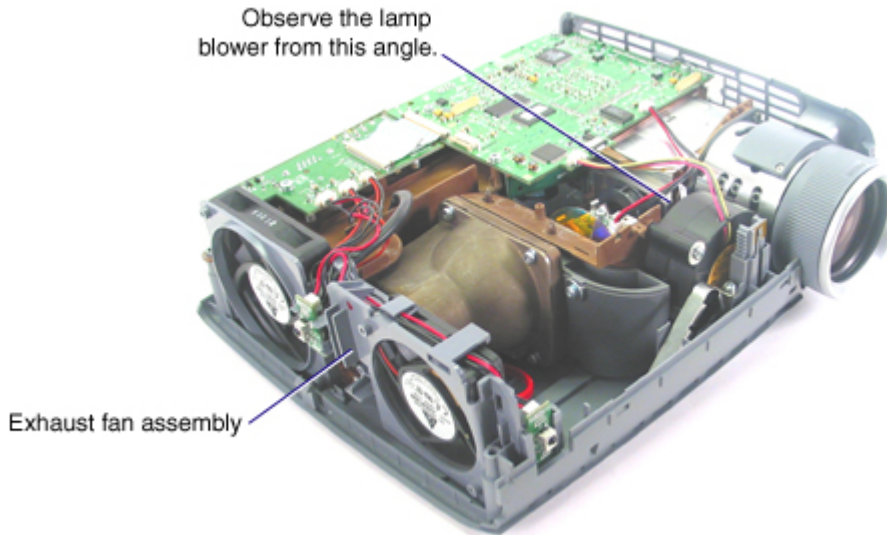
You can visually check the operation of the two exhaust fans to see if they both work properly. Check the fans if the projector exhibits symptoms of overheating or if the red status LED indicates that a fan issue is present.

The exhuast fans are visible through the exhaust bezel.
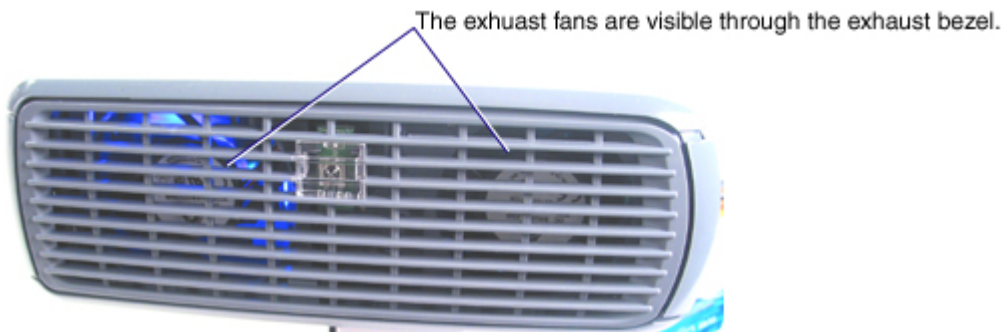
Lamp blower

You can observe the **lamp blower** from the side adjacent to the color wheel (see the photo above). The lamp blower is a three-wire fan, and failure will cause the Fan Stopped message to appear. The lamp will shut off.

Checking fan voltages

Checking fan voltages allows you to determine whether the fan or the ECA to which it connects is faulty.

1 Remove the top enclosure (page 31).

2 Plug the projector into a power source.

3 Measure the voltage at pin one at both fans and the blower at both power down and power up states. The voltage for both exhaust fans and the lamp blower should be ~5VDC when the lamp is off, and ~11VDC when the lamp is on. Additionally, pin two on the lamp blower should read 1.5VDC when the blower is good, and 3.3VDC when the blower is not working properly.

Color wheel motor   Lamp blower

4   1

Pin	Voltage
1	5v lamp on-11v lamp off
2	1.5v (good), 3.3v (bad)
3	0.0v
4	0.0v

Exhaust Fans

Pin	Voltage
1	5v lamp off, 11v lamp on
2	0v

Keypad cable

2   1   3   1
40mm fan   60mm fan
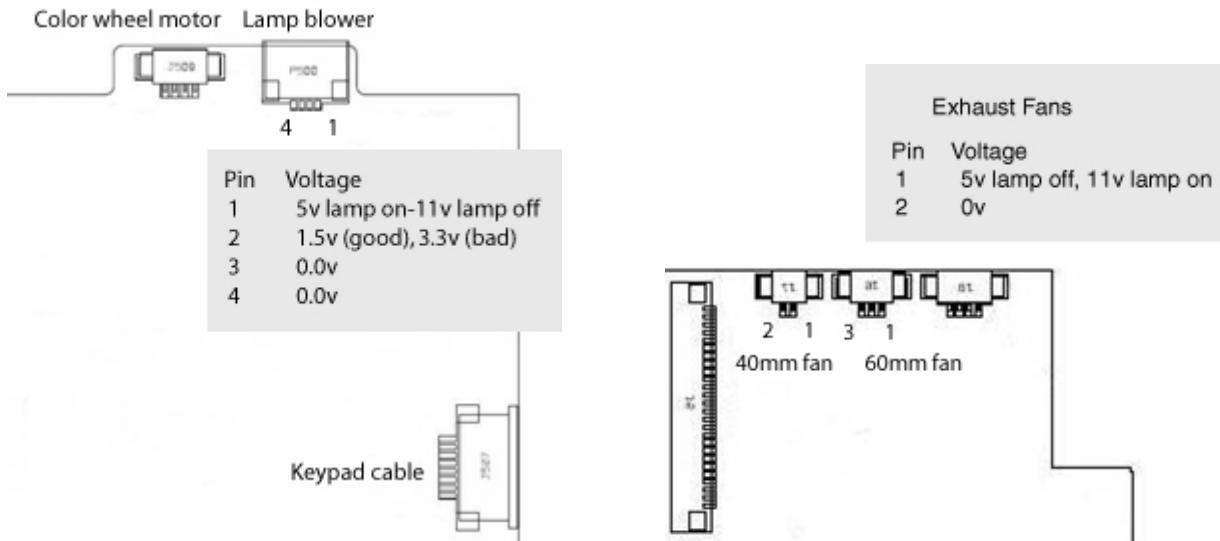
Controller ECA detail   **I/O ECA detail**

If the voltage on pin one is good and the fan/blower does not work, replace the part. If voltage is not present, the controller is most likely faulty.

Parts Removal and Replacement

Removable Parts Hierarchy

The flow chart below shows what parts must be removed to access each FRU in the projector. The parts on the first level (the lamp door, for example) are accessible without removing any other parts. The more levels down a part is, the more parts you need to remove.

```
Start
  ├─► Lamp door ──► Lamp
  │
  └─► Focus ring ──► Front bezel ──► Top enclosure ──► Controller ECA ──► Chassis ──► Optical engine
                         │                                    │                │              ├─► zoom ring
                         ▼                                    ▼                ▼              └─► Lamp blower
                    Front IR                              I/O ECA         Power supply
                    window                                   │                │
                                                             ▼                ▼
                                                         I/O EMI          Power supply
                                                         shield           insulator

                    Controller EMI shield  (above Controller ECA)

                    Side IR window ◄── Intake vent
                    Side IR window ◄── Exhaust vent ──► Color wheel cable
                    Exhaust fan assembly ◄── Controller-I/O cable
                                          Color wheel assembly

                    Bottom enclosure
                    Remove all parts.
```

Exploded View

Top enclosure

I/O EMI shield

I/O ECA

Controller EMI shield

Controller ECA

Chassis

Chassis insulator

Power supply

Optical engine

Zoom ring

Bottom enclosure

Intake bezel

Side IR window

Front bezel

Front IR window

Focus ring

Focus ring trim

Lens cap

Lamp module

Lamp door

Lamp and Lamp Door

The lamp door fits over the lamp cavity on the bottom of the projector. It includes a tab that closes the interlock switch when the door is shut.

The projection lamp consists of a metal housing, an enclosed reflector assembly and an arc tube.
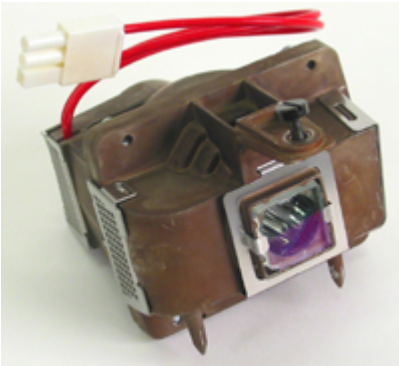
CAUTION The lamp module gets very hot during operation. Allow the lamp to cool for 60 minutes before handling it.

1   Use your fingers or a small bladed screwdriver to release the locking tabs on the lamp door. Then remove the door.
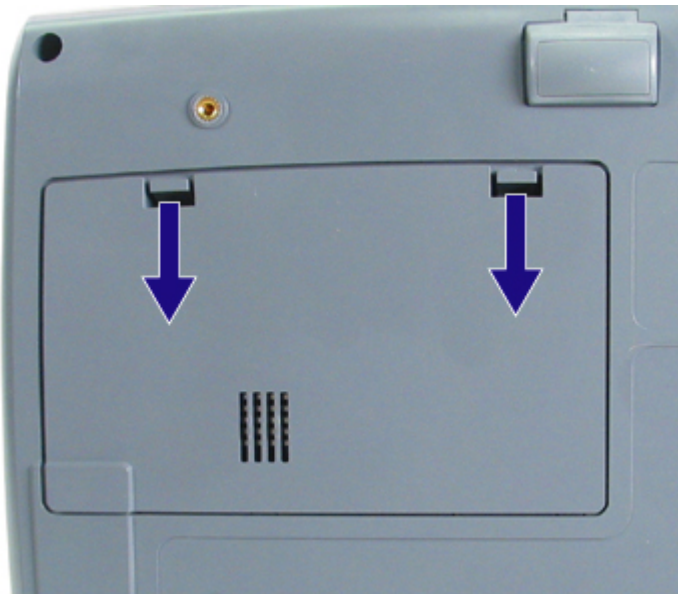
2 Release the locking tab on the top of the lamp power connector, then unplug the cable from its connector in the lamp cavity.

Handle (not shown)   Screw

Lamp power cable connector
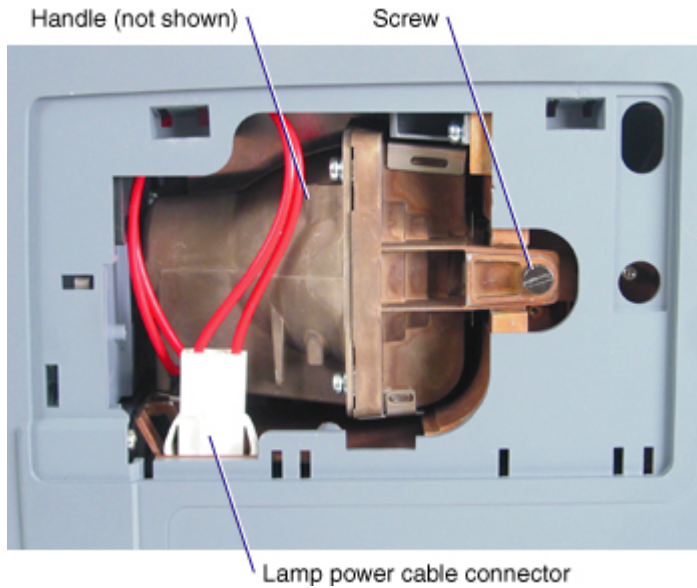
3 Loosen the captive screw on the lamp module.

4 Release the handle from its catch, then lift the lamp out of the projector.

Assembly Note

♦ The projector will not power up if the lamp and lamp door are not installed.

Focus ring

The focus ring snaps onto projection lens barrel. The focus ring includes a trim ring that snaps onto the front of the focus ring. You need to remove the focus ring only when it needs to be replaced or when you replace the optical engine with a new one.

Focus ring   Focus ring trim

1   Grasp the ring and pull it firmly away from the projector.

2   If necessary, remove the trim ring from the focus ring. To do this, carefully pry the two pieces apart.
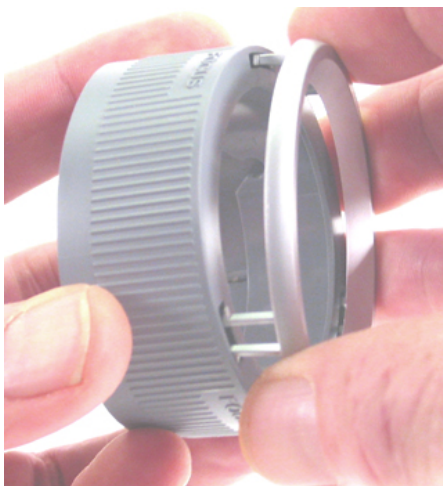
Assembly Notes

- If you removed the trim from the focus ring, make sure to align the parts correctly before snapping them together. The two parts fit together only one way.

- Align the three pins on the lens barrel with the three slots on the inside of the focus ring, then press the focus ring into place. Make sure it turns evenly and smoothly after installation.

Front bezel

The front bezel snaps onto the front of the projector. It includes the brand name. The front IR window snaps to the front bezel.

1   Carefully place the projector on its end so that the projection lens faces upward.

2   Use a T10 Torx driver to remove the silver M3x25 Plastite screw from the recess in the front corner opposite the projection lens.

NOTE You may need to work the screw out of the hole by using a magnetized driver.

3   Lift the end of the front bezel opposite the projection lens away from the projector. Swing the bezel outward and remove it from the projector.
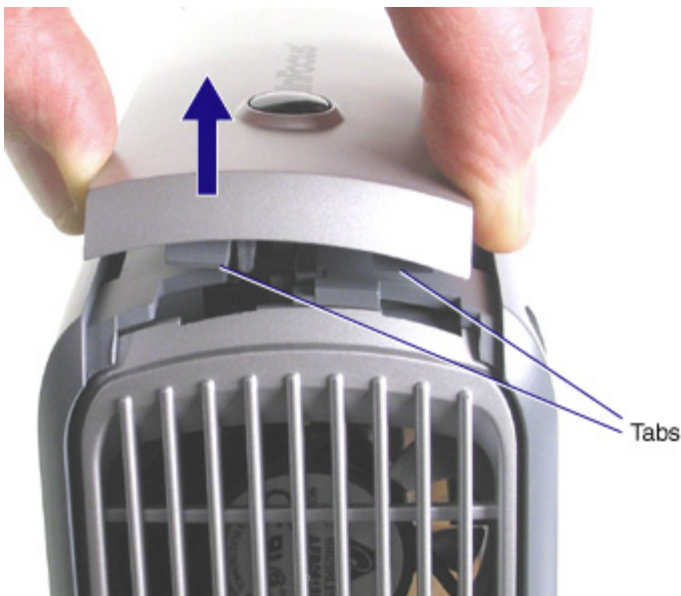
4 If you are replacing the front bezel with a new one, remove the front IR window and install it on the new one.

Assembly Notes

♦ If you are installing a new front bezel, make sure to install the front IR window first.

♦ To install the front bezel, fully insert the two tabs on the end of the bezel nearest the projection lens into the two matching holes in projector case. Make sure the bezel fits flush with the projector case.
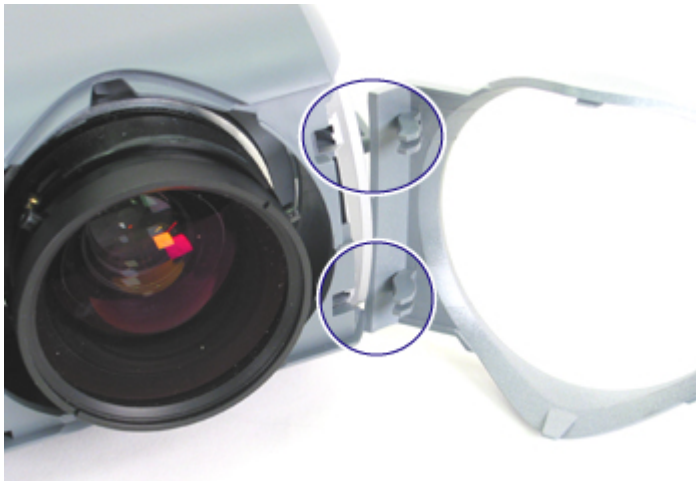
- ♦ To install the other end of the bezel, slightly flex the bezel so that you can insert the two tabs into the matching holes in the projector case.

- ♦ Install the M3x25 screw in the bottom case. Torque it 4 in-lb (.42 Nm).

Top Enclosure

The top enclosure covers the top half of the projector. Once you remove the top enclosure, you have access to a number of parts inside the projector.

The top enclosure includes the keypad, the LCD/keypad ECA, the speaker and the elevator button. These parts are not available separately. When you replace the top enclosure, adhere a new brand label to the top.

1   Remove the front bezel (page 28).

2   Carefully place the projector on its end so that the projection lens faces upward.

3   Use a T10 driver to remove the three silver M3x25 Plastite screws that fasten the bottom enclosure to the top enclosure. The fourth screw was removed to access the front bezel.

Screw recesses

NOTE You may need to work the screw out of the hole by using a magnetized driver.

---

4   Turn the projector right side up on the on work surface.

5 Lift the front of the top enclosure so that you can unplug the keypad cable from its ZIF connector on the controller ECA.

Keypad cable ZIF connector
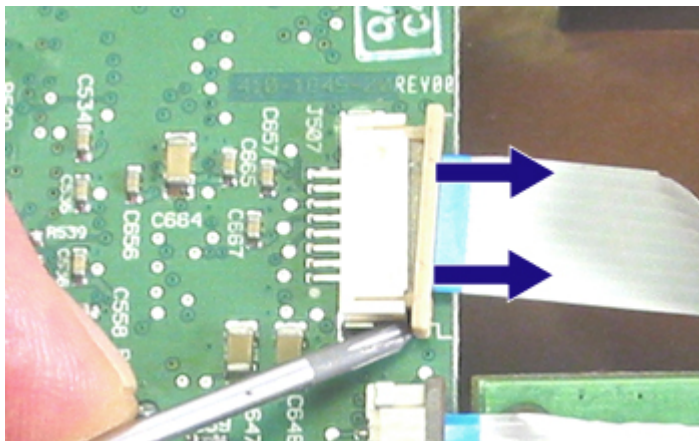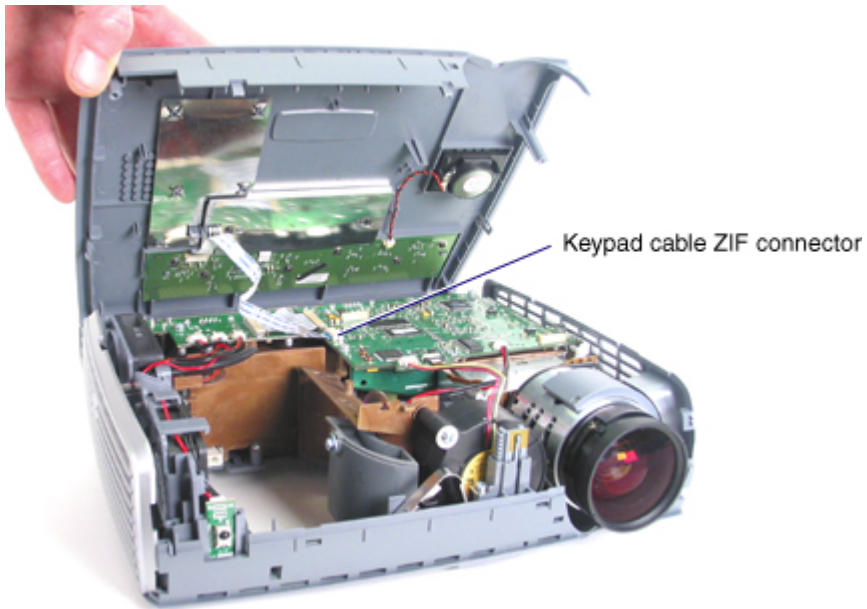
Assembly notes

♦ Connect the keypad cable to the controller first.

♦ Insert the five alignment tabs on the rear of the top enclosure into the matching holes in the bottom enclosure. Then swing the top closed

♦ Make sure the front of the top enclosure mates properly with the bottom. The two parts should fit flush.

Exhaust and Intake Bezels

The intake bezel fits on the projection lens side of the projector. The exhaust bezel fits on the opposite side, adjacent to the exhaust fan assembly. An identical, clear IR window fits into each bezel. All three parts are replaceable.

Intake bezel   Exhaust bezel   IR window
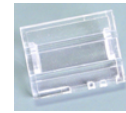
The bezels are not fastened to the bottom case. They secured in place when the top and bottom enclosures are fastened together.

1   Remove the top enclosure (page 31).

2   Lift the bezel out of the bottom enclosure.
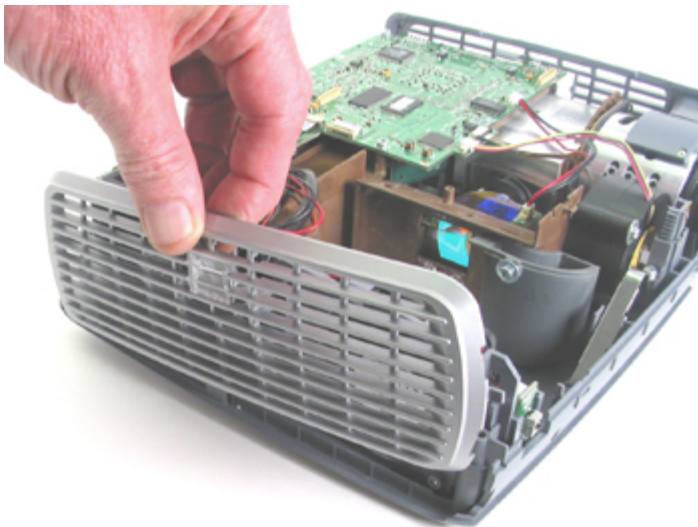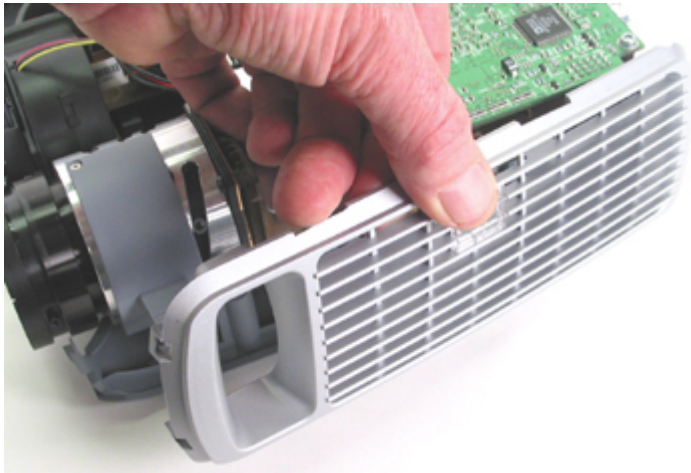
Assembly Notes

♦ When you replace the exhaust bezel, note how the front and rear of the bezel interlock with the bottom case.
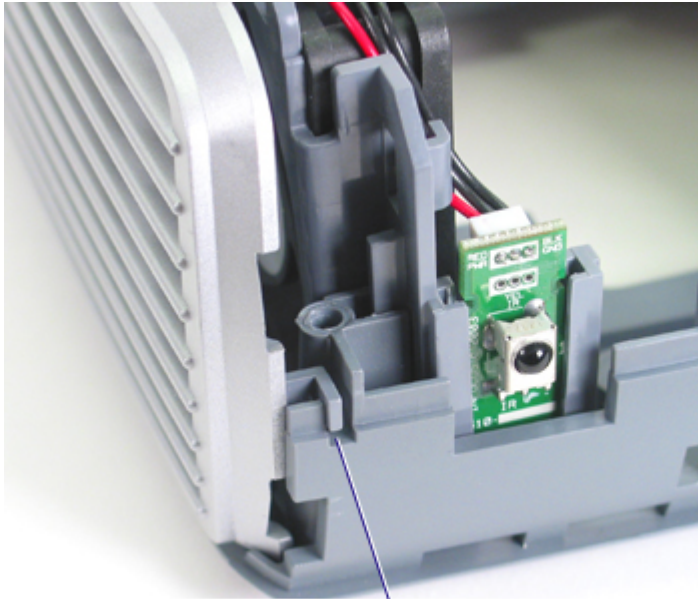
The tab on the front of the exhaust bezel fits into this slot in the bottom enclosure.
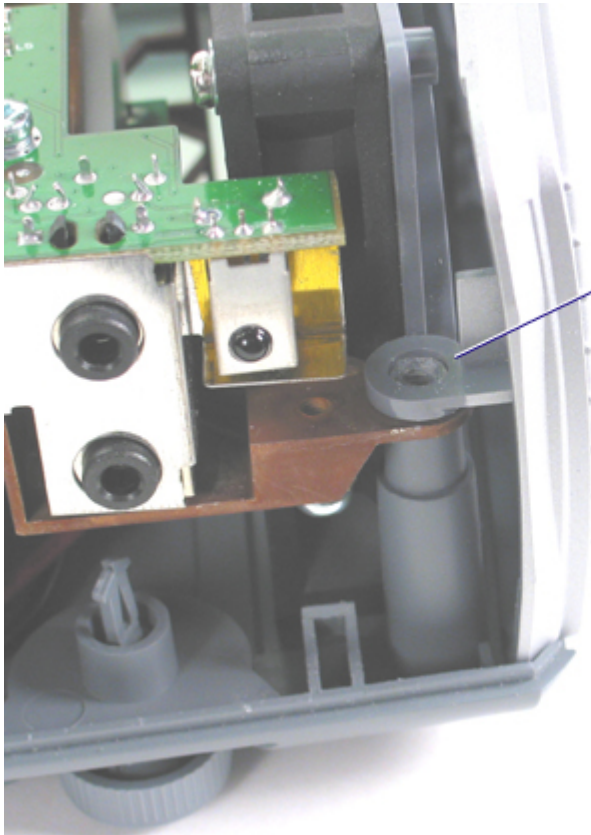
The tab on the rear of the bezel fits over the boss in the bottom enclosure.

♦ The rear of the intake bezel also features a tab that fits over a boss in the bottom enclosure.

The tab on the rear of the bezel fits over the
boss in the bottom enclosure.
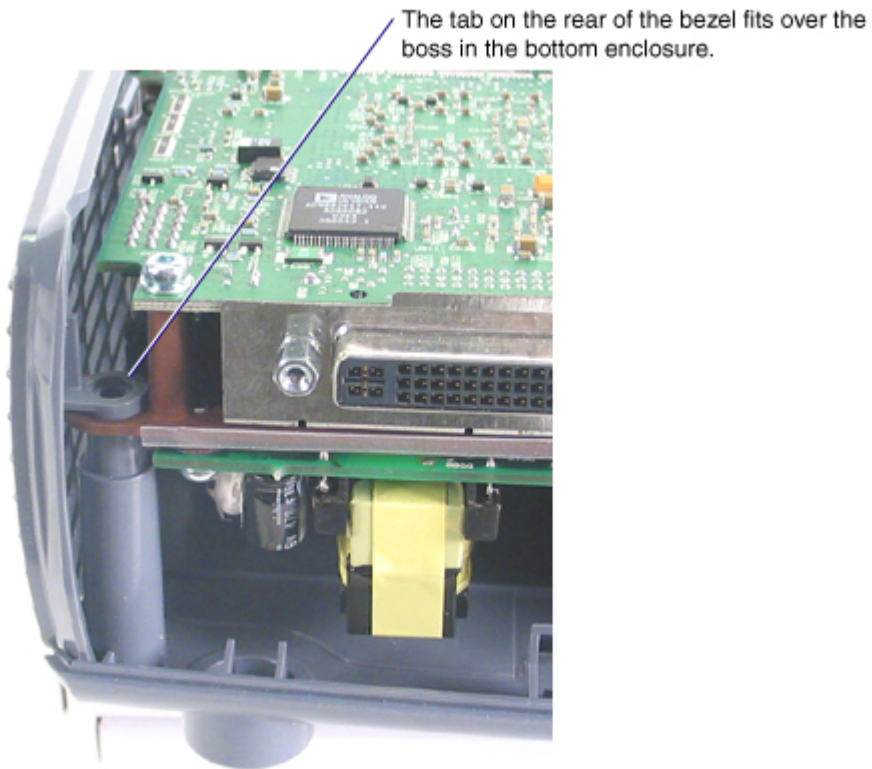
Exhaust Fan Assembly

The exhaust fan assembly is comprised of 60mm and 80mm exhaust fans, the front and side IR assembly, the safety cable, and a bracket. The assembly is located on the side of the projector adjacent to the lamp. The parts are not available separately.

Exhaust fan assembly
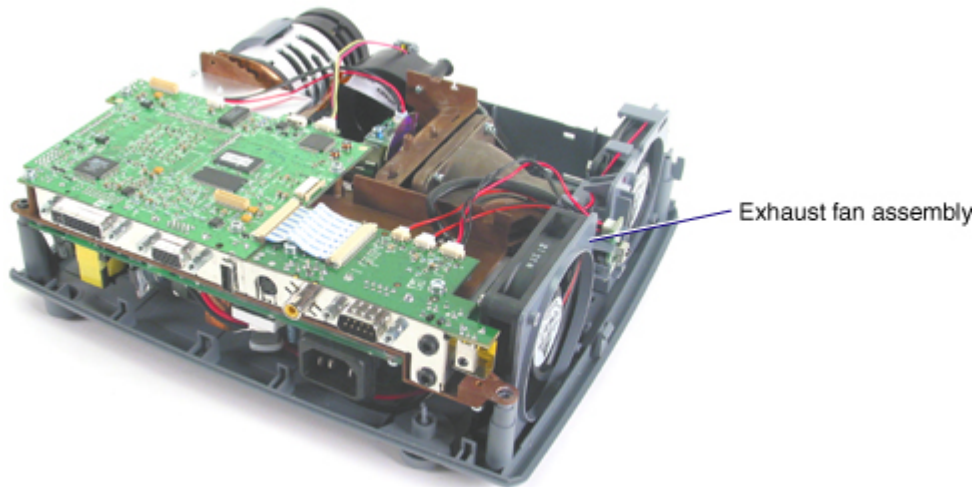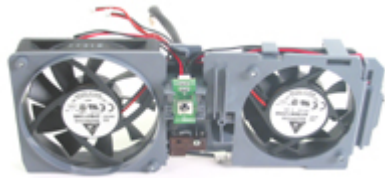
3 Remove the following parts:

Front bezel (page 28)

Top enclosure (page 31)

Exhaust bezel (page 34)

4 Unplug the exhaust fan cables and the IR cable from their connectors on the controller ECA.

Exhaust fan and IR cables
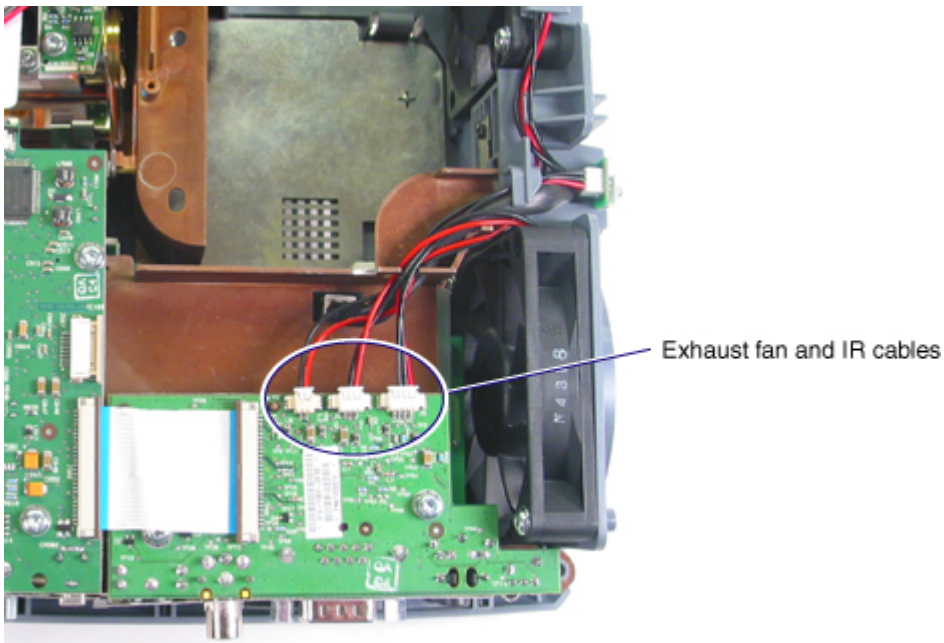
5 Unplug the safety cable from its connector on the power supply. You access the connector through a hole in the chassis. Remove the cable from the cable guide in the metal chassis.

Safety cable
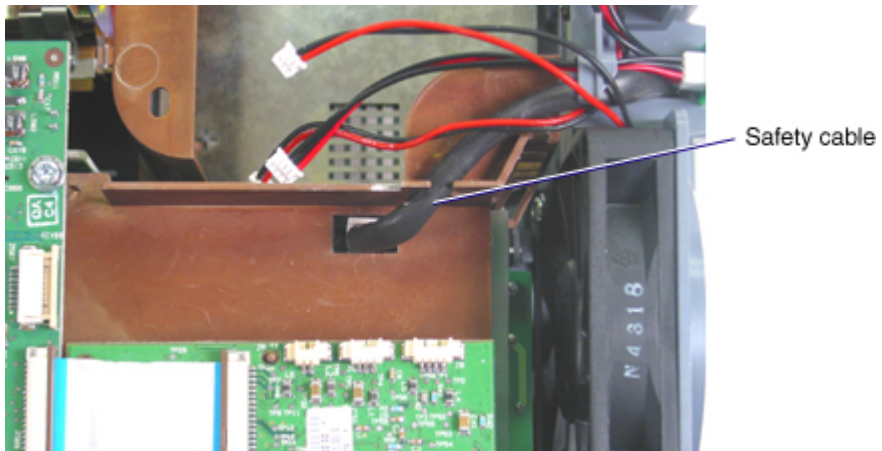
6 Lift the exhaust fan assembly out of the projector. There are no fasteners to remove.
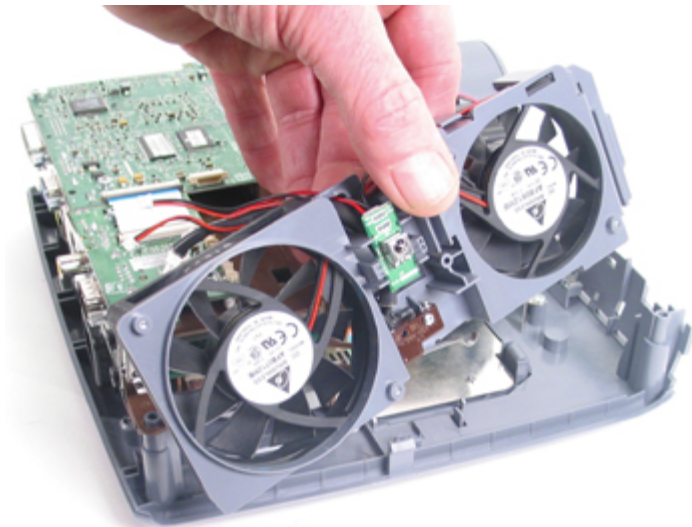
Assembly Notes

♦ When you install the exhaust fan assembly, make sure the front and rear of the fan bracket fits properly in the bottom enclosure.
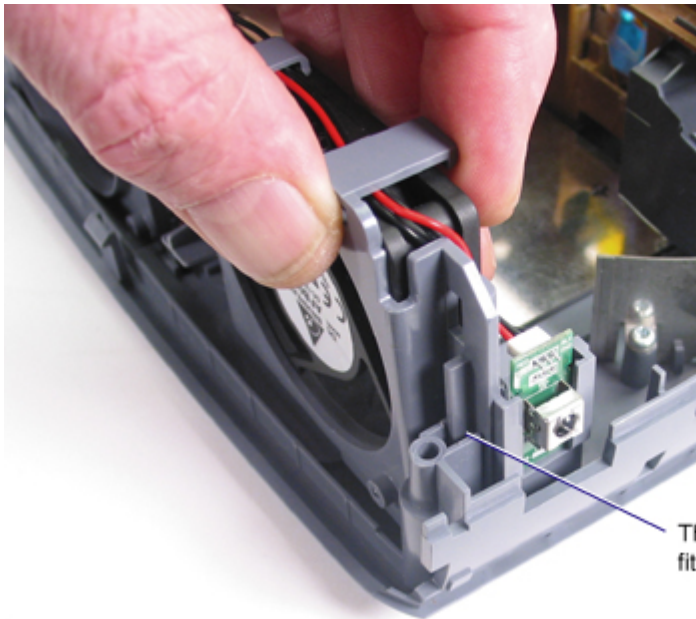
The guide on the fan bracket fits into a slot in the bottom enclosure.
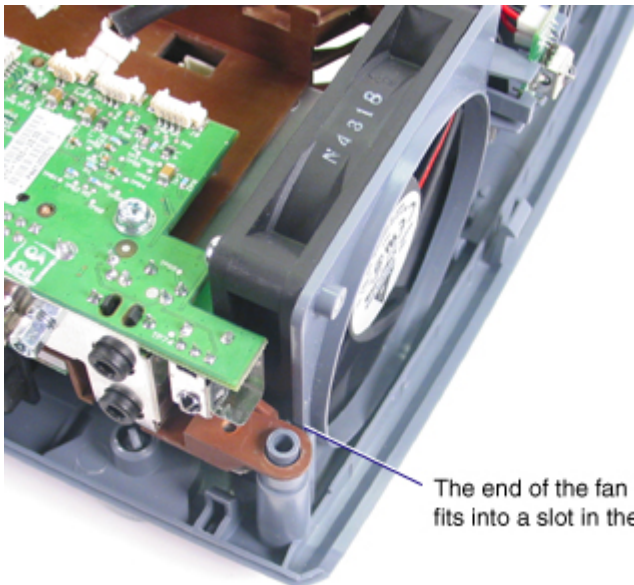
The end of the fan bracket fits into a slot in the bottom enclosure.

♦ Plug the safety cable connector in first. Use a needle nosed pliers or screwdriver to ensure that the connector fully engages.

♦ Make sure the cables route through the guide on the metal chassis.
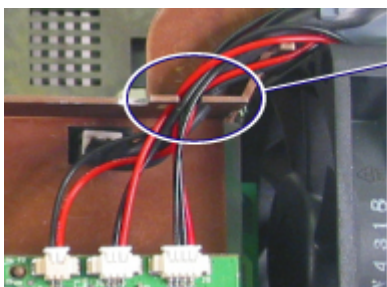
Cable guide

Color Wheel Assembly

The color wheel assembly includes the color wheel, the color wheel ECA and the color wheel bracket. You can remove and replace the assembly without removing the controller or the engine.
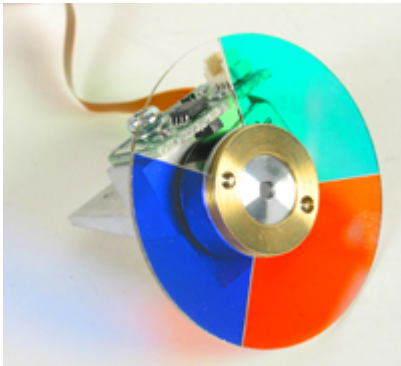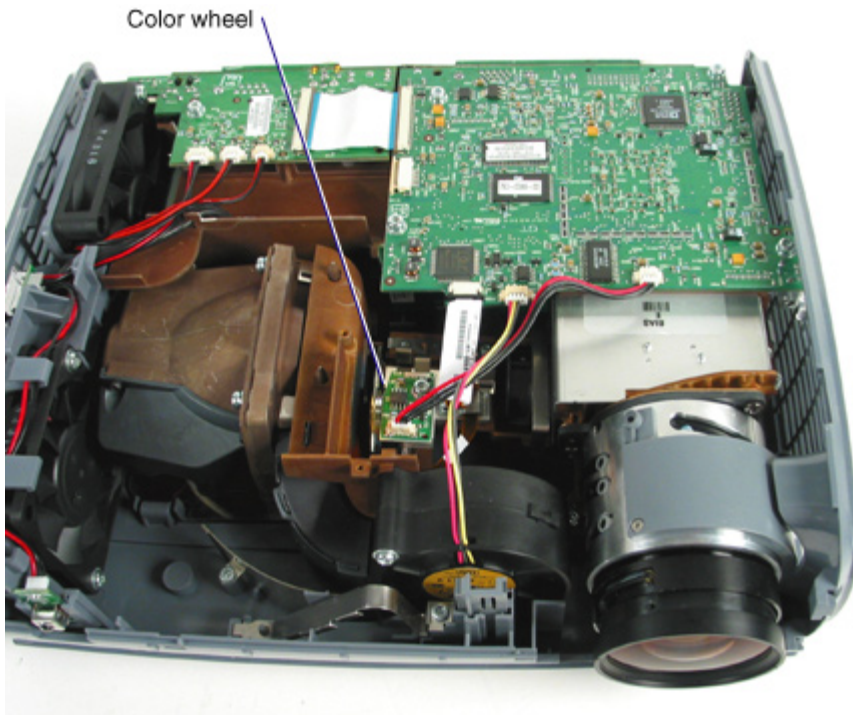
Color wheel

1 Remove the following parts:

Front bezel (page 28)

Top enclosure (page 31)

2 Unplug the color wheel ribbon cable, the front blower cable from the controller ECA. Unplug the color wheel ECA cable from the color wheel ECA. Move the lamp blower and color wheel ECA cables out of the way.

Lamp blower cable

Color wheel ribbon cable

Color wheel ECA cable

3 Remove the M3x8 screw that fastens the cable clip and color wheel bracket to the engine casting. Note that the clip keeps the color wheel ribbon cable in place. When you remove the screw, the color wheel assembly will be loose.

This M3x8 screw fastens the clip and color wheel to the engine.
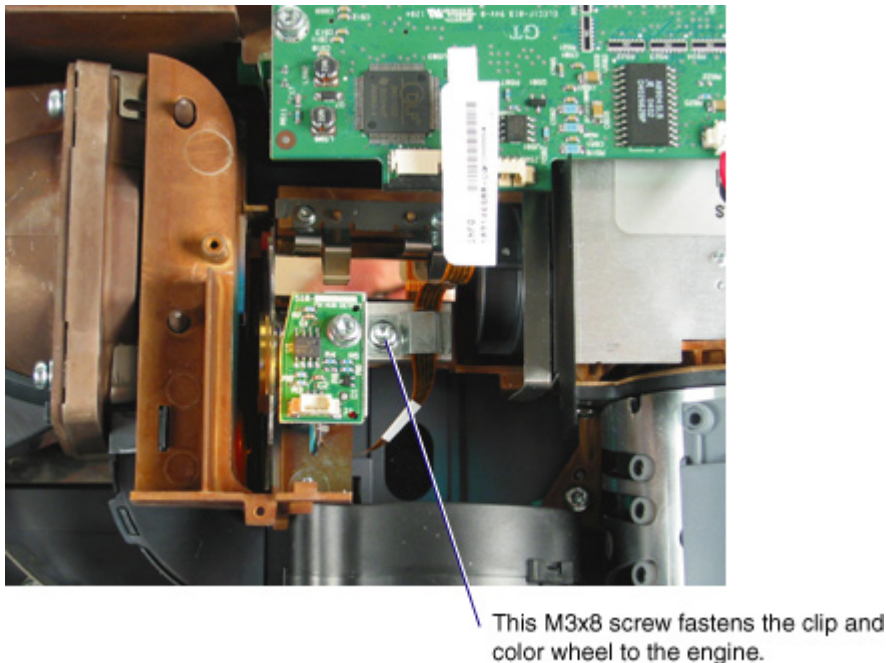
4   Lift the color wheel assembly out of the projector. Take care not to scratch the glass wheel as you lift.

Assembly Notes

♦   When you install the color wheel assembly, make sure the alignment pin on the engine fits into the matching hole in the color wheel bracket.
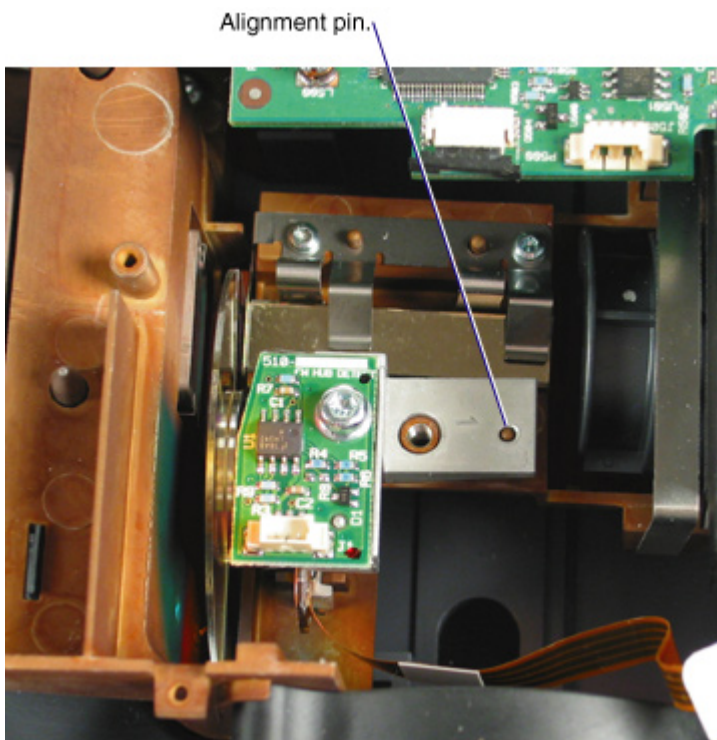
♦ Start the M3x8 screw and cable clip, then insert the ribbon cable before tightening the screw. Torque the screw to 6 in-lbs (.67 Nm).
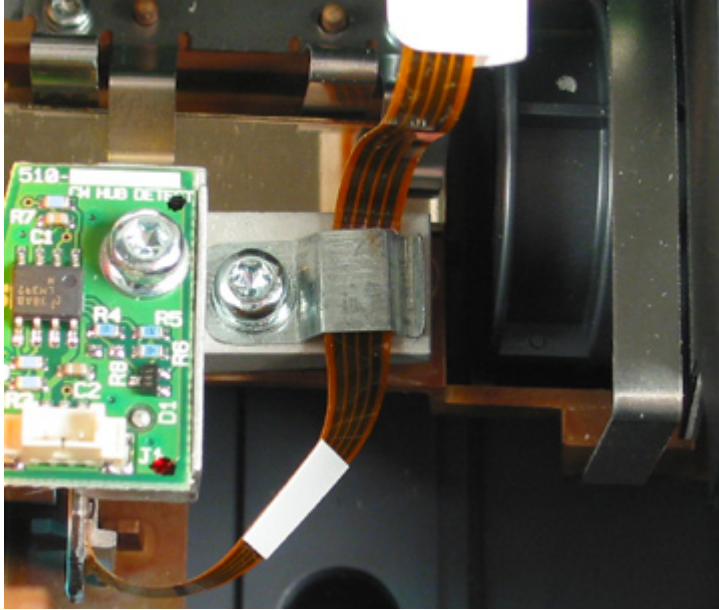
♦ Plug the three cables in once the color wheel assembly is secure.

Controller ECA and I/O ECA

The **controller ECA** and the **I/O ECA** are fastened to the top of the metal chassis. The two boards are connected to each other with the **I/O-controller cable**. The controller ECA connects to the power supply via a direct connection on the bottom of the board. Each board has its own **I/O EMI shield**. All five parts are replaceable.
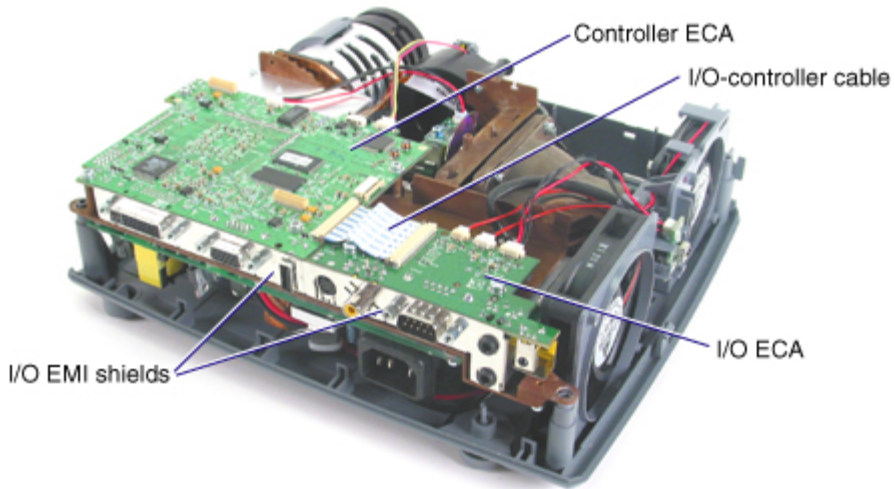
| Controller ECA | I/O ECA | I/O-controller ECA | I/O EMI shields |
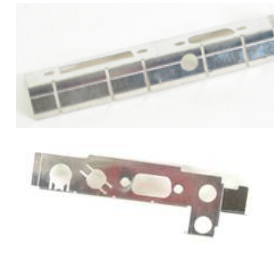
WARNING Be sure to take proper ESD precautions while working near the driver ECA. It can be easily damaged by static electricity. ECAs damaged by static electricity require replacement.

1   Remove the following parts:

Focus ring (page 26)

Front bezel (page 28)

Top enclosure (page 31)

Intake bezel (page 34)

Controller ECA

1. Unplug the color wheel cable, the color wheel sync cable and the lamp blower cable from their connectors on the controller ECA.

Lamp blower cable
Color wheel sync cable
Color wheel cable
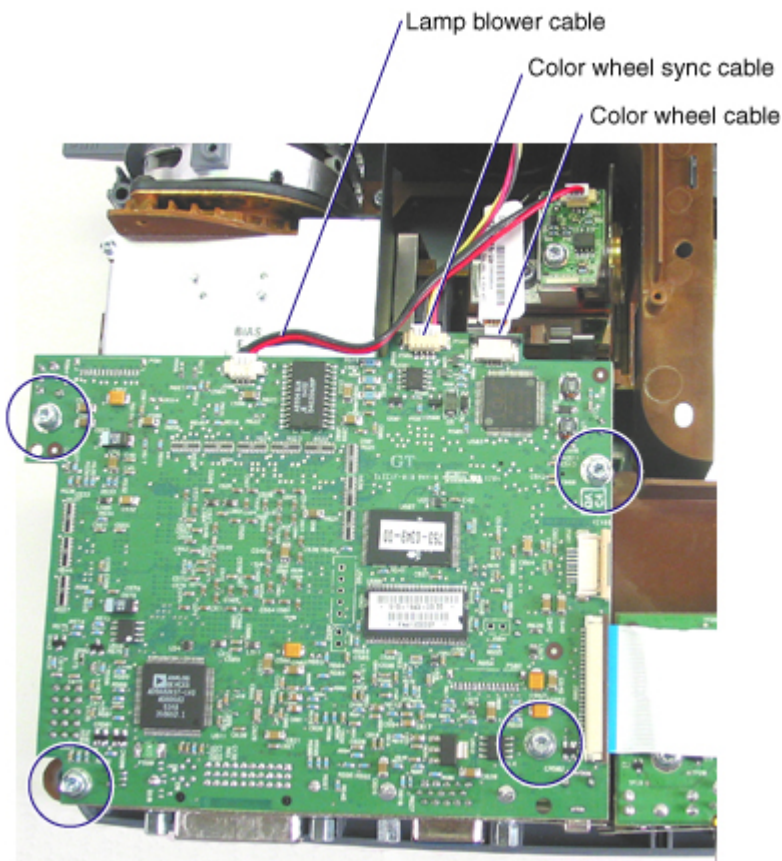
2. Unplug the I/O-controller cable from its ZIF connector on the controller ECA.
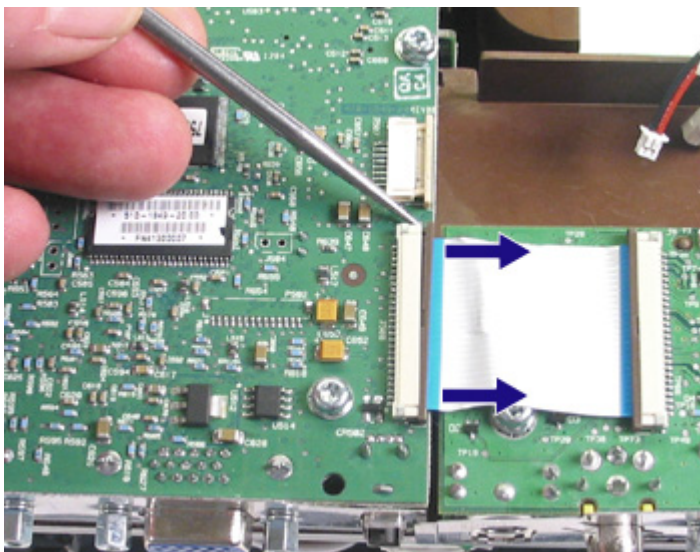
3. Use a T10 driver to remove the four M3x8 machine screws that secure the controller ECA to the chassis. The screw locations are noted in the illustration in step 1.

4   Lift the controller by the two corners shown below. As you remove the controller, the controller/power supply connector and the controller/DMD connector disengage.
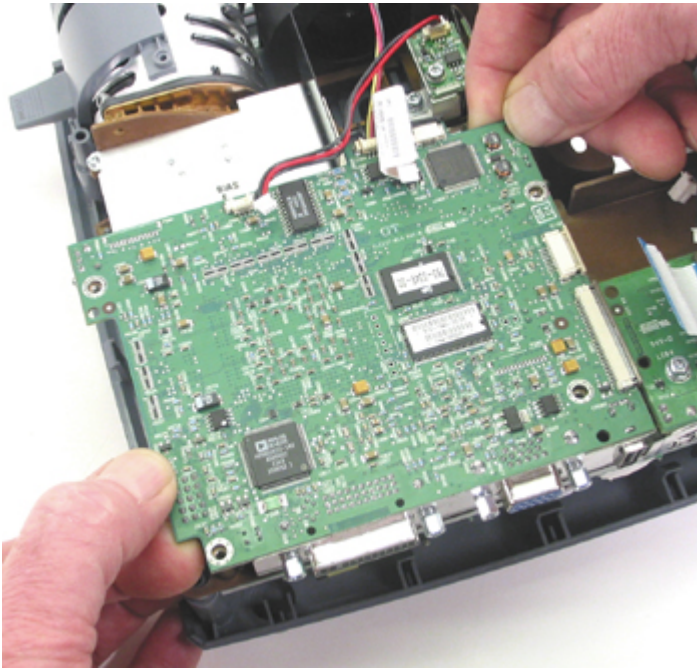
5   If you are replacing the controller or the controller EMI shield, separate the shield and the controller. The shield fastens to the controller with four jack screws.
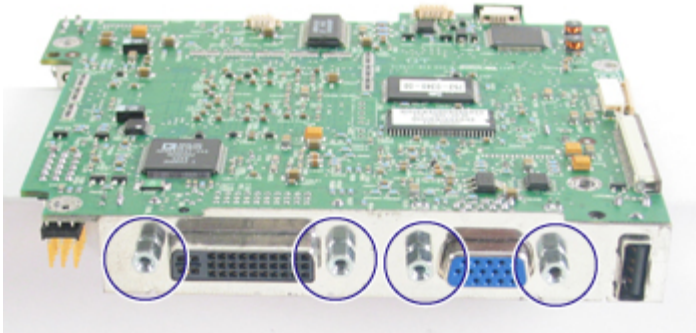
Assembly Notes

♦ Note the location of the power supply and DMD connectors before installing the controller ECA. Firmly press the controller into place. Make sure the pins on the controller match the receptacle on the power supply.
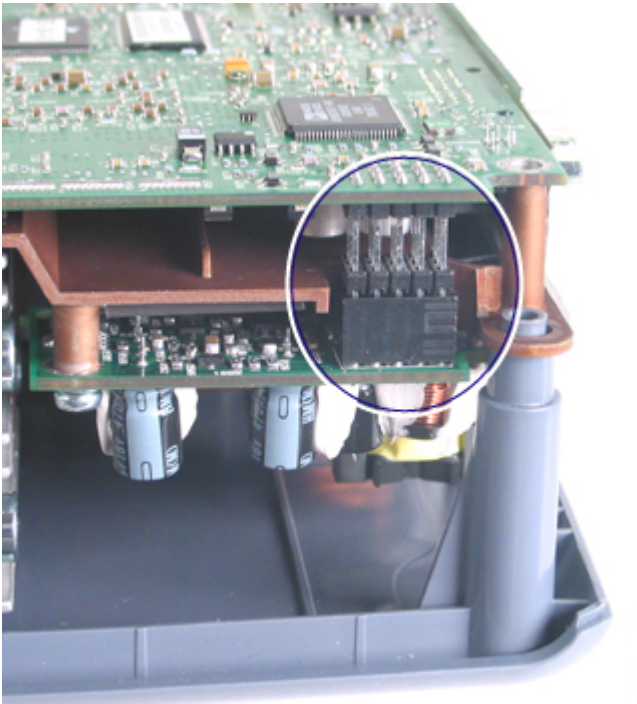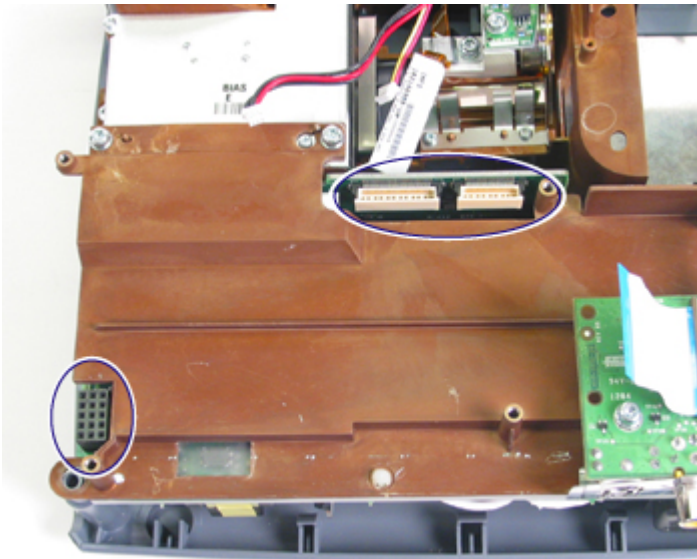
♦ Torque the M3x8 screws to 6 in-lbs (.67 Nm).

I/O ECA

1   Unplug the I/O-controller cable from its ZIF connector on the I/O ECA. See step 2 above for details.

2   Unplug the two exhaust fan cables and the IR cable from the I/O ECA.
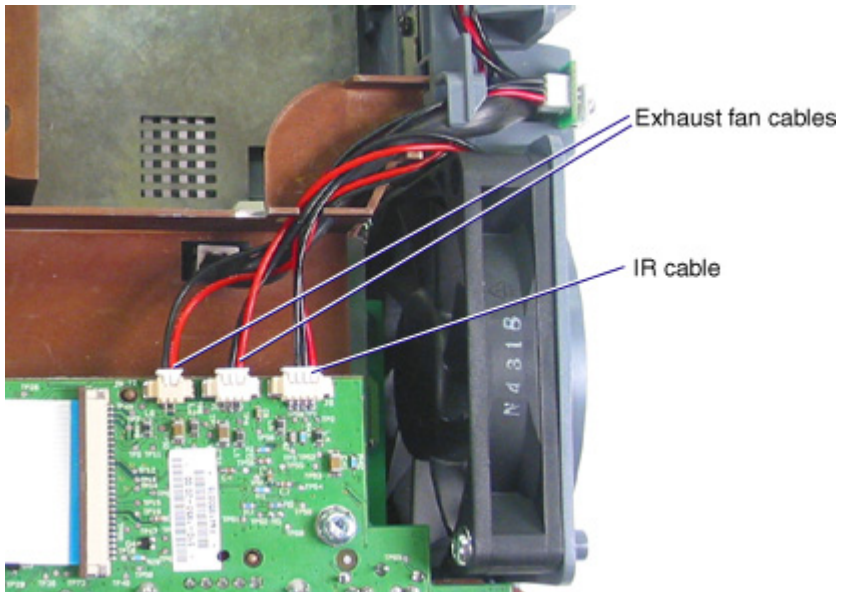
3   Use a T10 driver to remove the two M3x8 machine screws that fasten the board to the chassis.

4   If you are replacing the I/O ECA or the I/O EMI shield, separate the two parts. The shield fastens to the board with two jack screws.
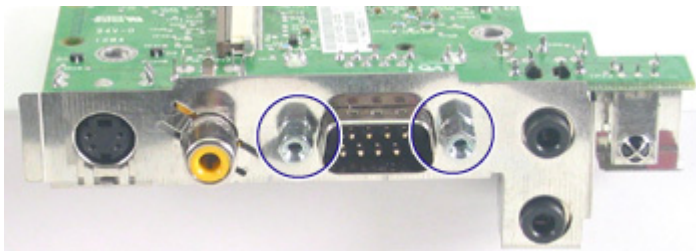
Assembly Notes

♦   When you install the I/O ECA, make sure to align the pin in the chassis with the matching hold in the ECA.
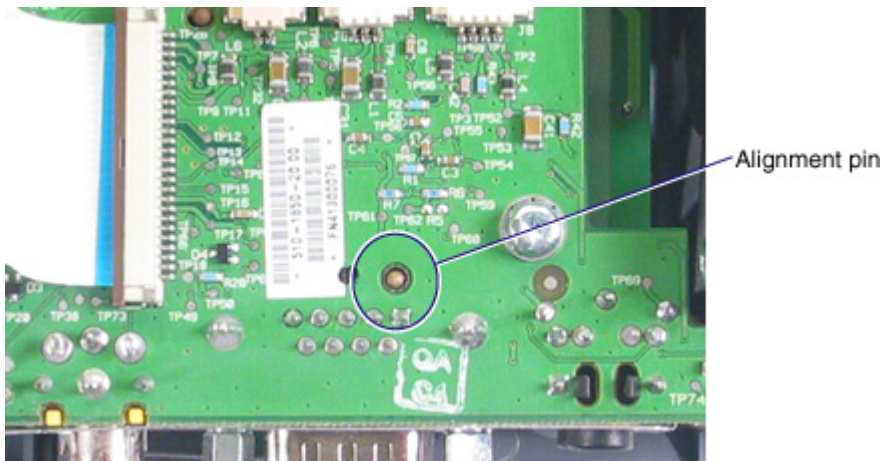
♦   Torque the two M3x8 screws to 6 in-lbs (.67 Nm).

Power Supply and Chassis

The **power supply** fastens to the metal **chassis**. The plastic **power supply insulator** fits between the chassis and power supply. The three parts are available separately.
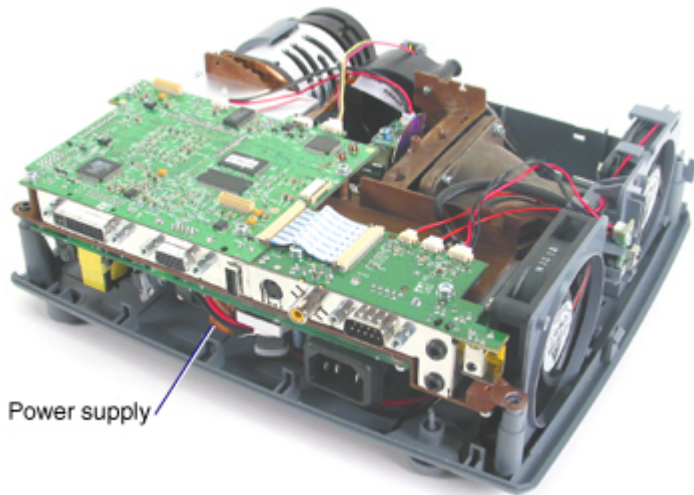
Power supply

Power supply ECA

Chassis

Power supply insulator

Remove the power supply assembly

1   Remove the following items:

Focus ring (page 26)

Front bezel (page 28)

Top enclosure (page 31)

Controller and I/O ECAs (page 44)

2   Lift the exhaust fan assembly out of the bottom case.

3   Remove the three M3x10 screws that fasten the power supply assembly to the optical engine and to the bottom enclosure.
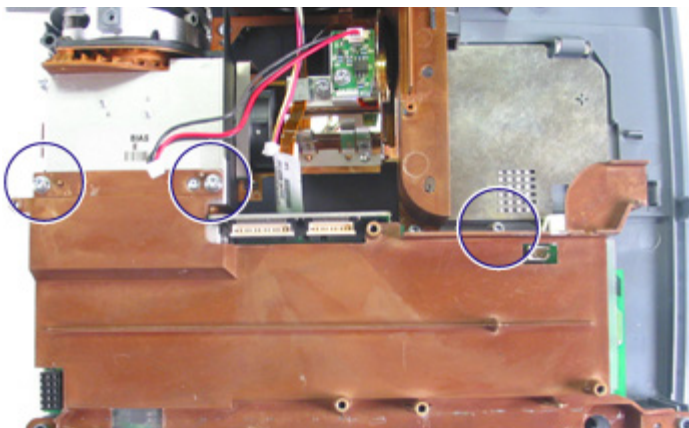
4 Lift the chassis and power supply out of the bottom.

5 If you need to replace any of the assembly components, go the next step. Otherwise, place the assembly aside and continue to the next procedure.

6 Remove the lamp power cable connector from its mount in the chassis. To do this, pinch the locking tabs on the connector with one hand, then withdraw the connector with the other.

Lamp power cable connector
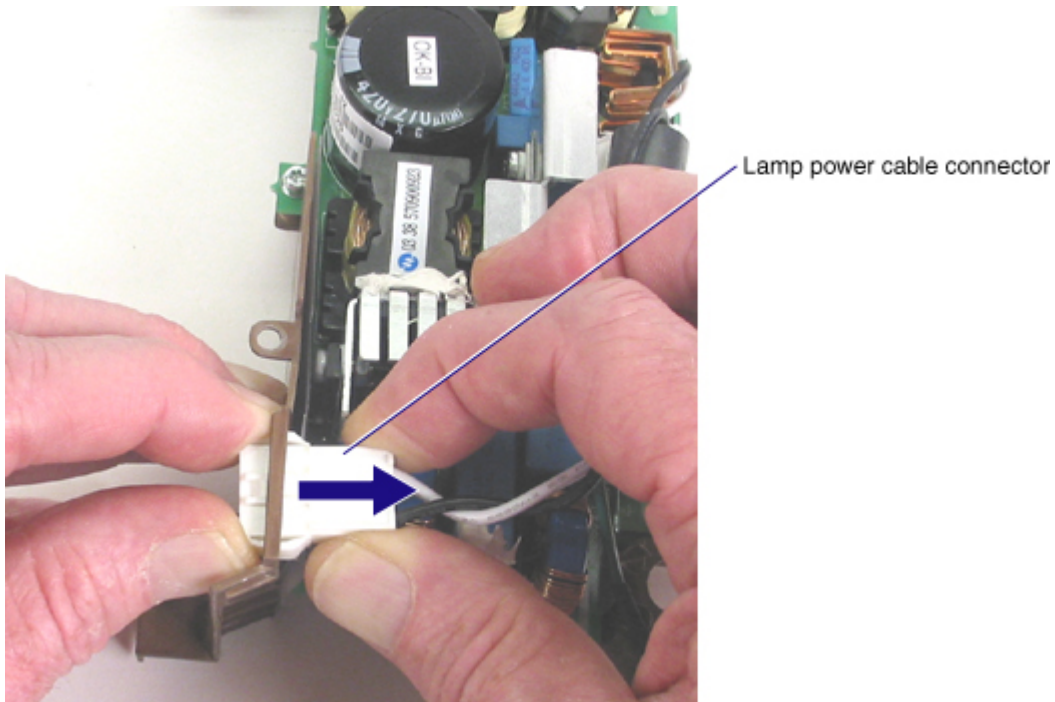
7 Use a T10 driver to remove the five M3x8 machine screws that fasten the power supply to the chassis, and the M3x8 screw that fastens the ground cable to the chassis.

Ground cable
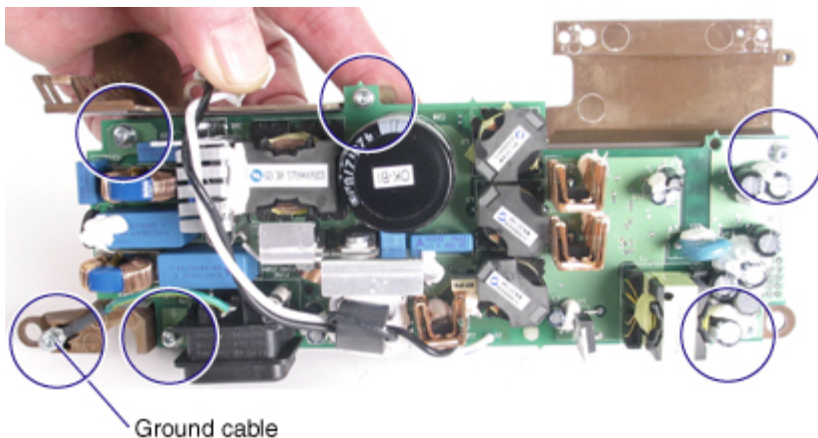
NOTE The power supply remains attached to the chassis once the screws are removed.

8 To separate the power supply and chassis, pinch the locking tabs on the plastic standoff located in middle of the AC plug side of the ECA. Then lift the power supply off of the chassis.
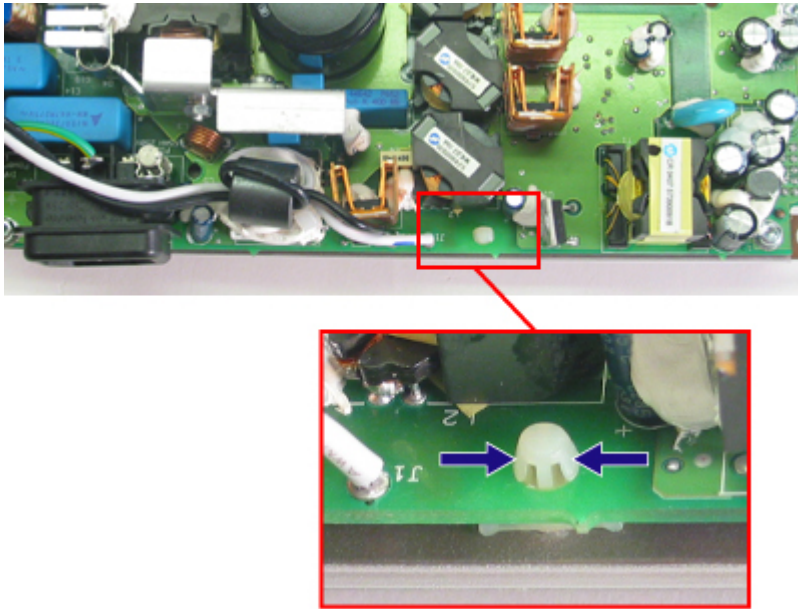
9 If you need to replace either the chassis or the power supply insulator, remove the plastic standoff from the chassis.

Assembly notes

♦ Make sure to fasten the power supply ground cable to the chassis.

♦ Torque all screws to 6 in-lbs (.67 Nm).

♦ Make sure that the lamp power cable connector is secure in its chassis mount.

CAUTION Do not reassemble the power supply assembly without the insulator.

Optical Engine

The optical engine includes all components in the light path except the lamp. Once you remove the engine, you can remove the **zoom ring** and the **lamp blower**. These two parts and the **color wheel sync cable** that fastens to the color wheel ECA are available separately.
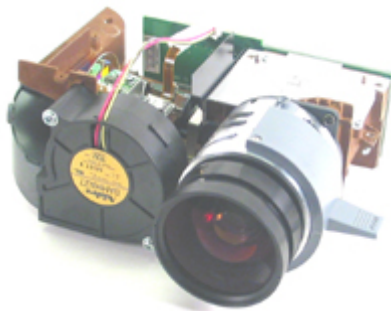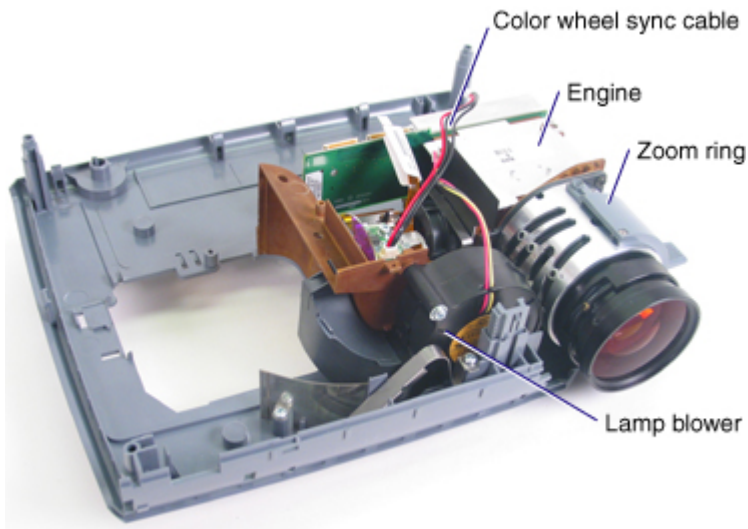
Optical engine	Color wheel sync cable	Zoom ring	Lamp blower

1 Remove the following items:

Lamp door and lamp (page 23)

Front bezel (page 28)

Top enclosure (page 31)

Exhaust and intake bezels (page 34)

Exhaust fan assembly (page 37)

Controller ECA (page 44)

Power supply assembly (page 49)

2   Remove the three M3x10 Plastite screws that fasten the engine to the bottom case.
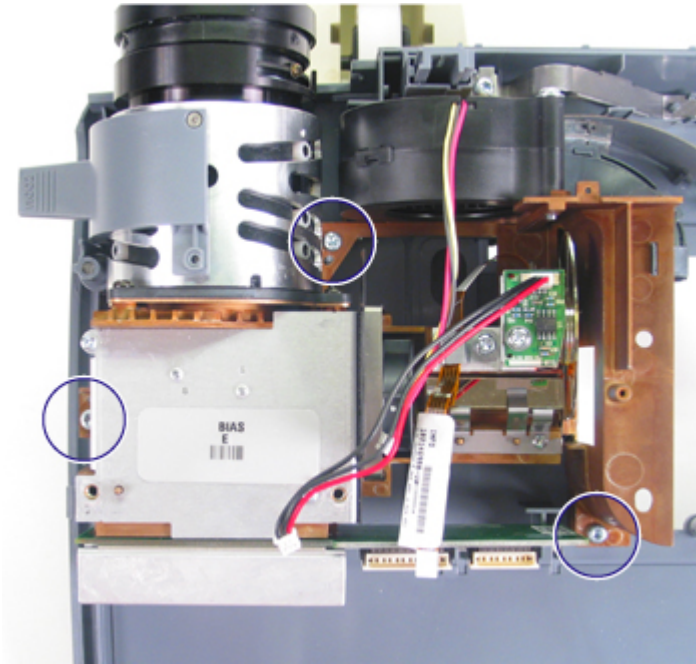
3   Lift the engine out of the enclosure.

4   If you removed the engine to access another part, put the engine aside and continue to that procedure. Otherwise, continue to the next step.

5   To remove the **zoom ring**, use a small Phillips screwdriver to remove the two M1.7x5 Phillips screws that fasten the zoom ring to the projection lens.

The portion of the zoom ring with the tab goes on top
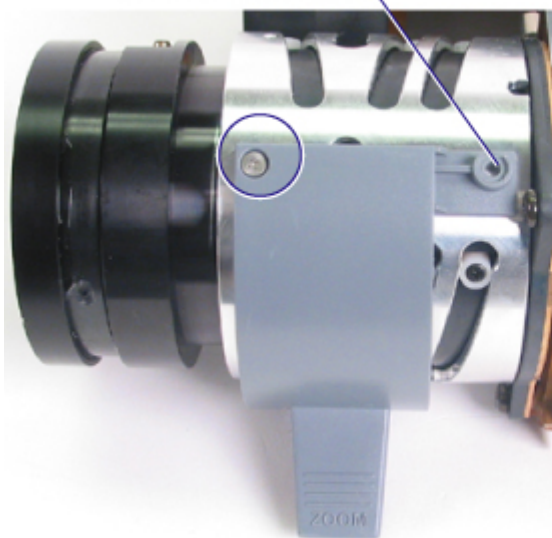
Top   Bottom

6 To remove the **lamp blower**, remove the two M3x30 Phillips screws with washers that fasten the blower to the engine assembly.
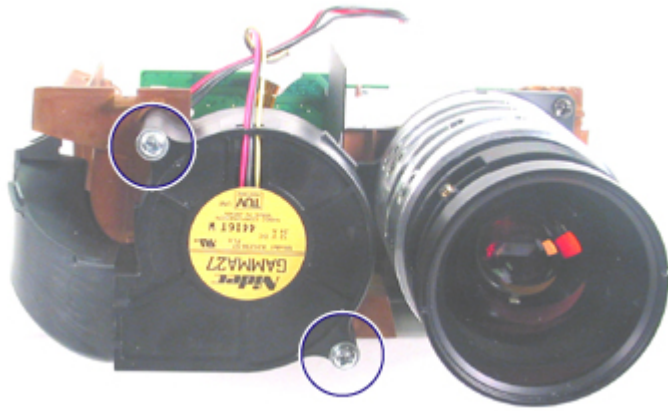
7 If you are replacing the engine, unplug the color wheel sync cable from its connector on the color wheel ECA.

Color wheel ECA
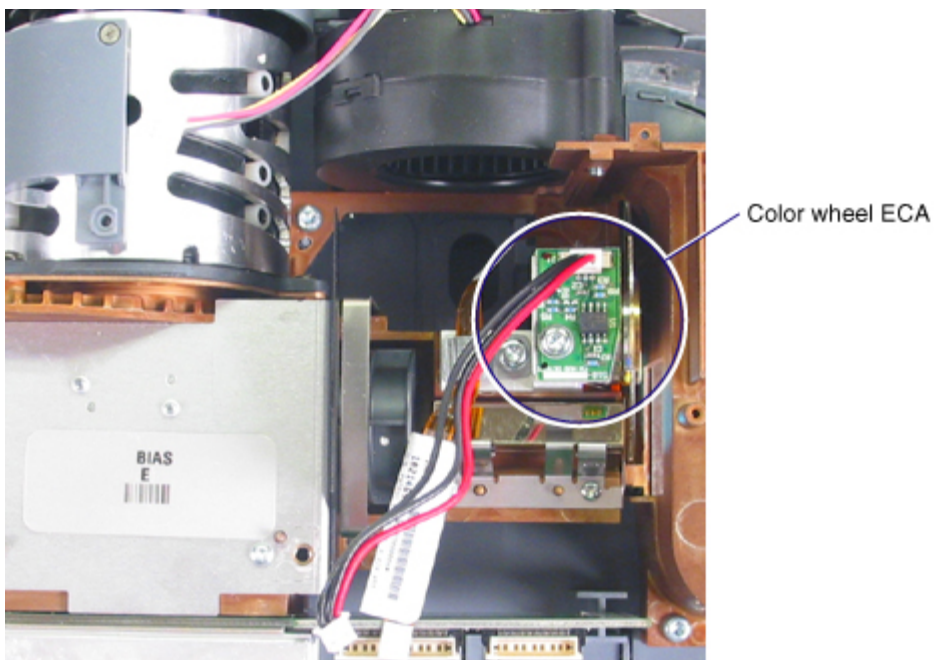
Assembly Notes

♦ Torque the M1.7x5 screws that fasten the zoom ring to the lens to 2 in-lb (.2 Nm).

♦ Torque the two M3x30 screws that fasten the lamp blower to the engine to 6 in-lb (.67 Nm).

♦ Torque the three M3x8 Plastite screws that fasten the engine to the bottom case to 4 in-lb (.42 Nm).

♦ If you are replacing the engine, make to plug the color wheel sync cable in.

Bottom Enclosure

The bottom enclosure encloses the bottom half of the projector. The bottom case includes the elevator assembly, the leveling foot
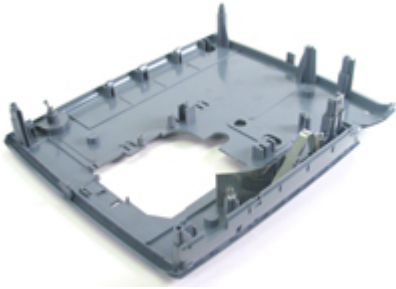
When you replace a bottom enclosure, adhere a new certification label and a new bottom model label to it.

1 Remove the following parts:

Focus ring (page 26)

Front bezel (page 28)

Lamp door and lamp (page 23)

Top enclosure (page 31)

Side vents (page 34)

Exhaust fan assembly (page 37)

Controller and I/O ECAs (page 44)

Power supply assembly (page 49)

Optical engine (page 52)

2   Remove the curved metal air deflector from the old bottom enclosure and install it on the new one. The air deflector is located adjacent to the lamp blower and elevator. Tighten the M3x8 Plastite screw to 4 in-lb (.42 Nm) with a T10 driver.

Post   Guide

Screw
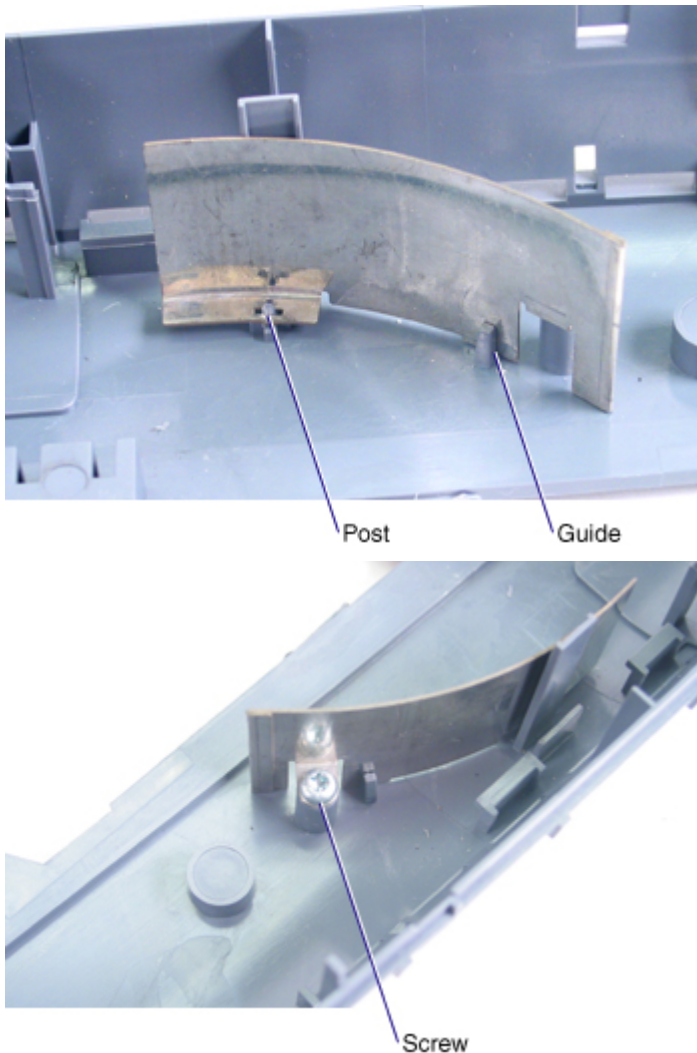
3   Remove the Serial Number label from the old bottom enclosure. You may need to use a heat gun to soften the glue.

4   Adhere a new certification label and model label to the new bottom case.

5   Adhere the old Serial Number label to the new certification label.
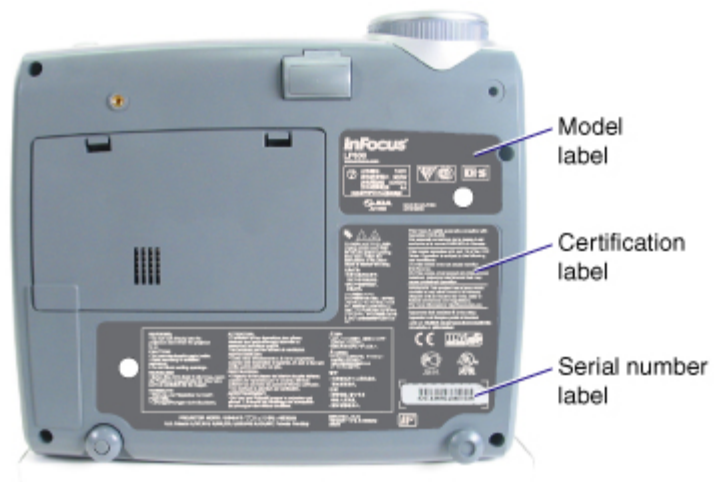
6   Install the parts you removed in the reverse order.

Light Tunnel

The **light tunnel** is comprised of four pieces of mirrored glass that are glued together to form a box with two open ends. The light tunnel focuses the light between the color wheel and the DMD.

An issue with the light tunnel is indicated when image banding appears on the right and/or left sides of the image. Usually, this means that the glue that adheres the sides of the light tunnel has deteriorated and the sides have slipped out of alignment.

The light tunnel is held in place on the optical engine with the metal **tunnel clip**, which, in turn, fastens to the engine body with two M2x3 screws. The tunnel clip is also a replaceable part.

Light tunnel   Tunnel clip
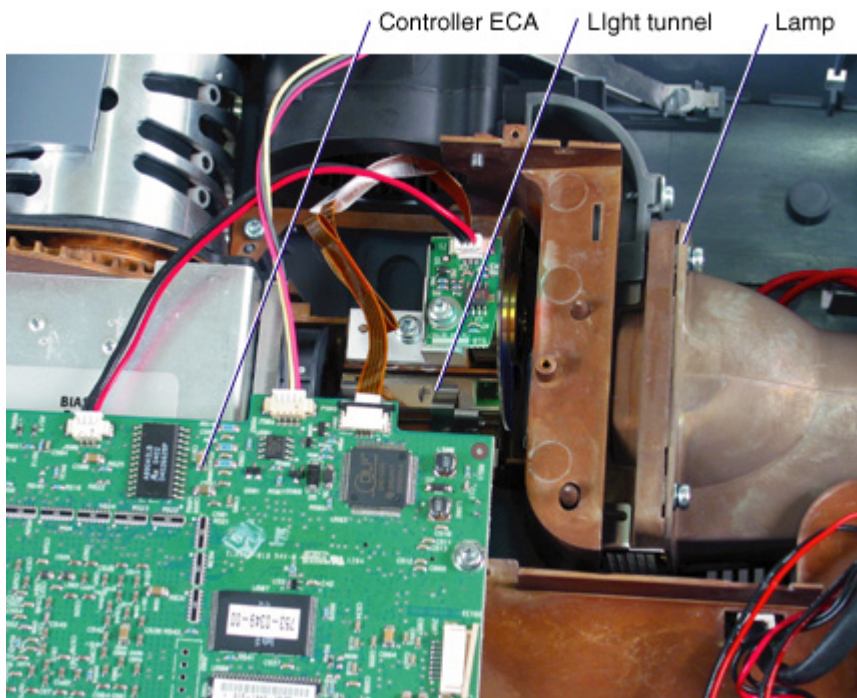
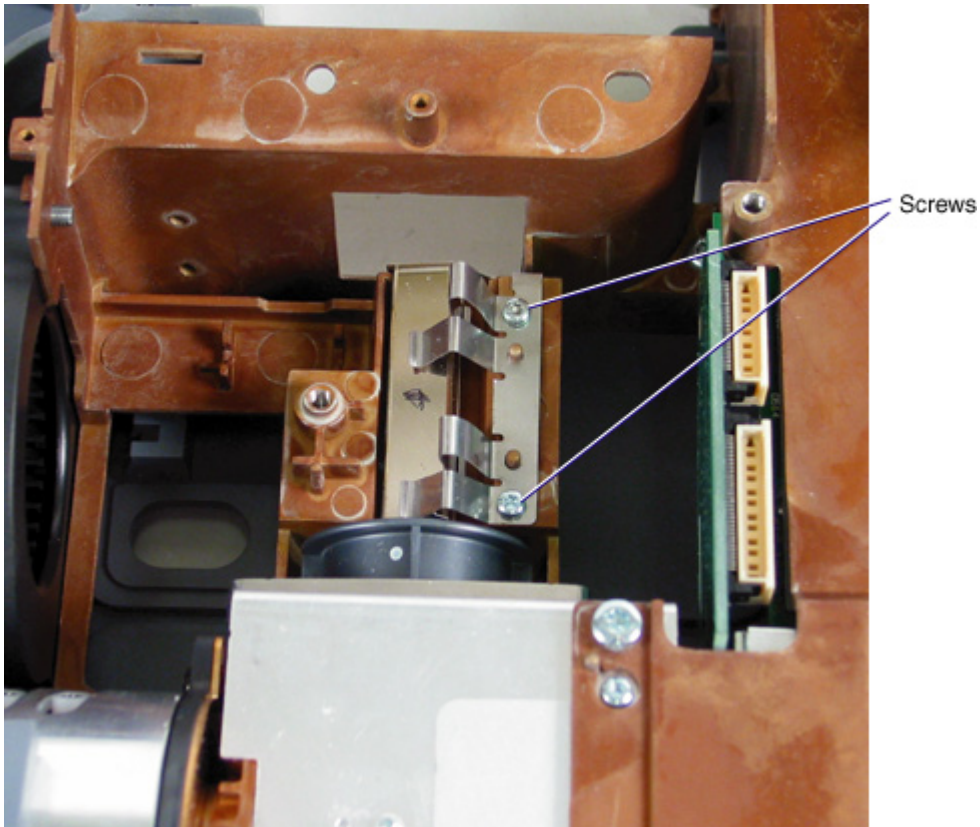Light tunnel location

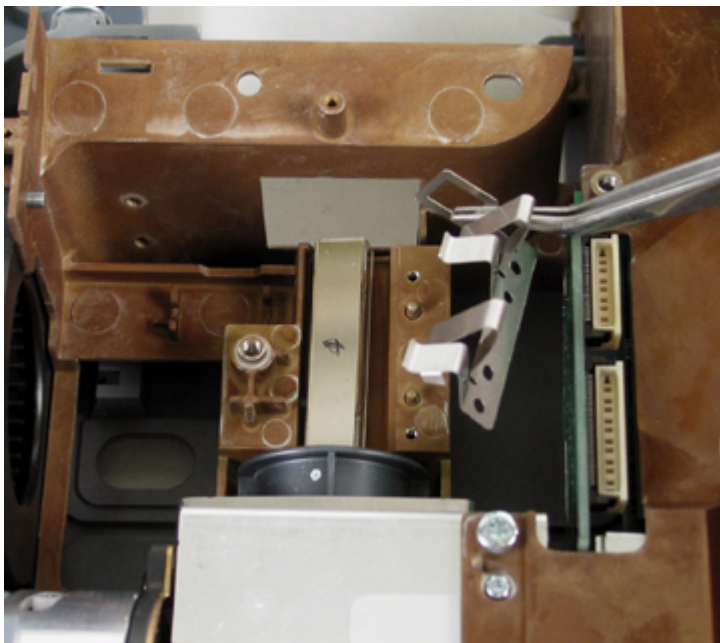**1** Remove the following parts:

Front bezel (page 28)

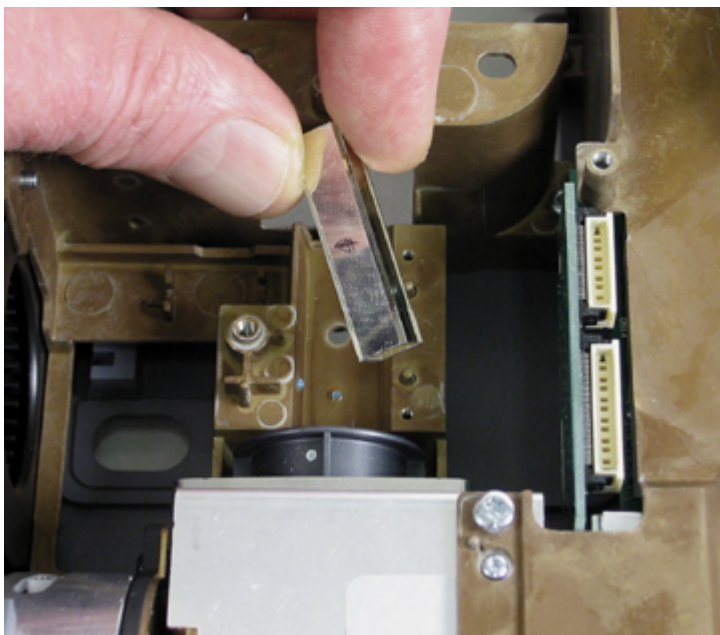Top enclosure (page 31)

Controller ECA (page 44)

Color Wheel Assembly (page 40)

2 Use a T6 driver to remove the two M2x3 screws that fasten the tunnel clip to the engine. Then lift the clip out of the projector with a tweezers.

3 Lift the light tunnel out of the projector.

4 To install the light tunnel, place it on the engine casting so that the end farthest from the color wheel meets the lip on the edge of the engine casting. Note that the wide sides of the light tunnel are on the top and bottom.

The wider sides fit on
the top and bottom.

This end of the tunnel
must meet the lip on the
edge of the engine casting
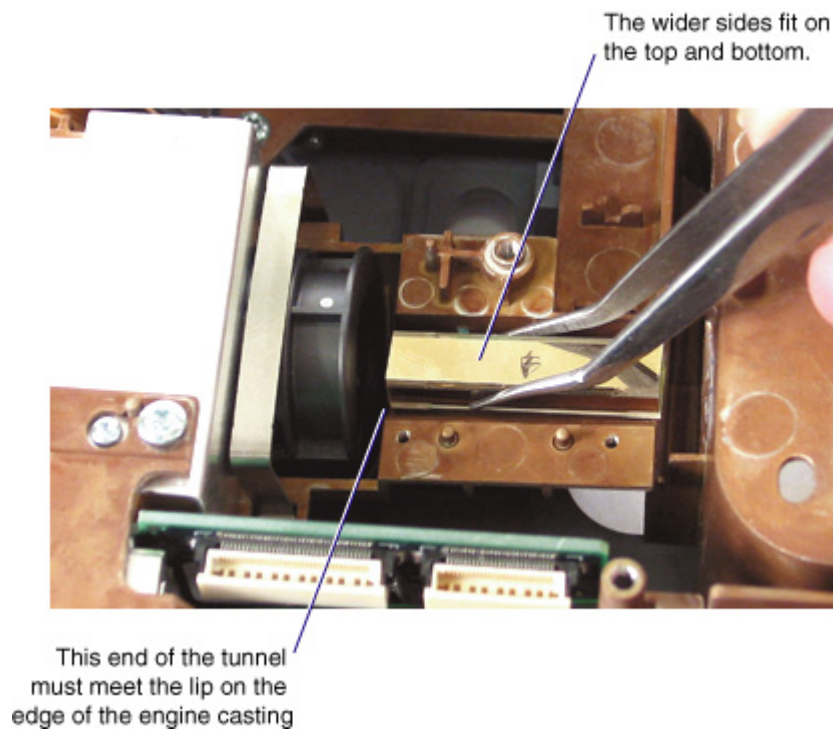
5 Slide the clip over the light tunnel so that two of the tabs press against the top of the tunnel and two press against the side. The two alignment pins in the engine fit into two matching holes on the clip. Once you get the clip in place, you must hold it down with your finger until you get the screws threaded.

These two clips press agains the side of the light tunnel.

Alignment pin
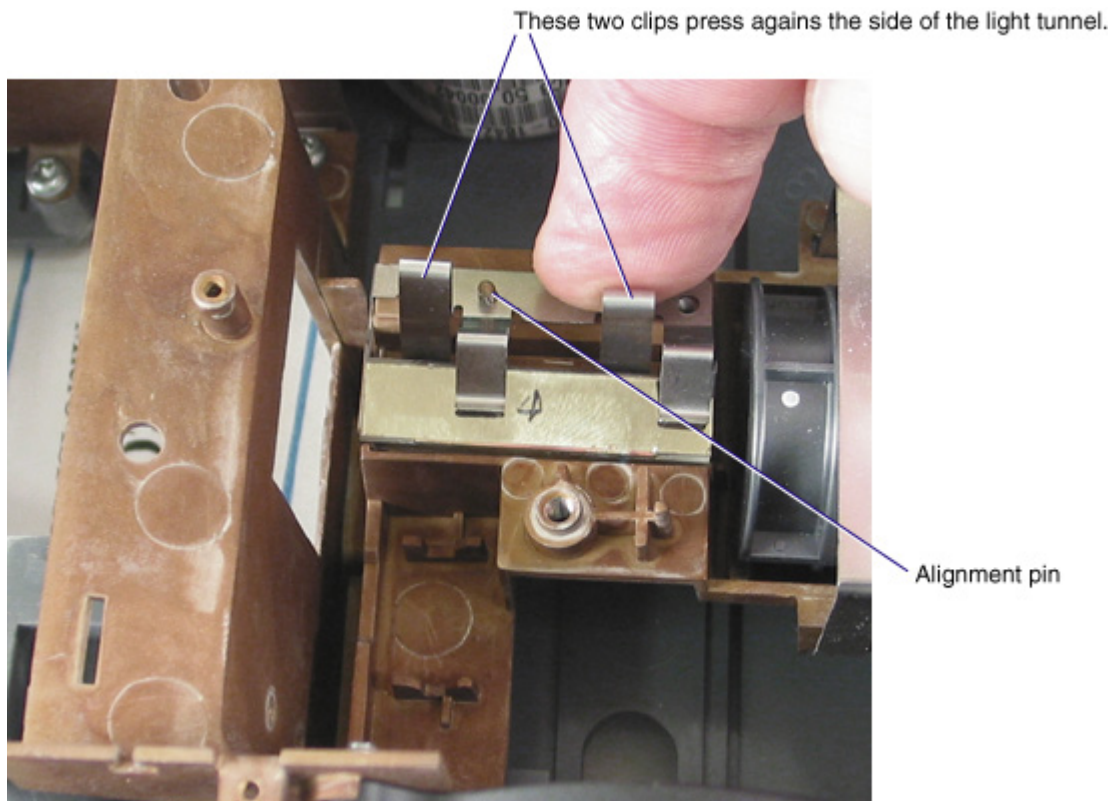
6 After you reassemble the projector, confirm that the sides of the image do not show banding. If you need to adjust the edges of the image, see the Nacho Family Service Manual.

Parts Lists

Illustrated Replaceable Parts List

Below is a list of replaceable parts (FRUs). It includes the part name as used in this service guide, as well as the part name as listed in the parts pricing list database. The names often differ.

NOTE Before you order a part, make sure that you confirm the correct part number in the online parts list for the projector you are working on.

Part Illustration	Part name in service guide	Part name in parts pricing list	Part number
See Labels on page 68	Labels	various	various
	Color wheel cable	Cbl assy,3p,1.25mm,hdr to hdr	211-0277-xx
	I/O-controller cable	Cable,ffc,1mm 26p,37.5 +1/-0mm	211-0281-xx
	Tunnel clip	Tunnel, LP600	315-0053-xx
	Power supply insulator	Insulator, power supply, LP600	329-0535-xx
	Tunnel clip	Clip, tunnel mount, LP600	330-1060-xx
	Chassis	Chassis, system ground,LP600	330-1104-xx
	Controller EMI shield	Shield, high speed ECA, LP600	330-1105-xx

Part Illustration	Part name in service guide	Part name in parts pricing list	Part number
	I/O EMI shield	Shield ,I/O, LP600	330-1106-xx
	Side IR window	Window, IR, side, LP600	340-1318-xx
	Front IR window	Window, IR, front, LP600	340-1320-xx
	Exhaust fan assembly (Includes 60mm fan, 70mm fan, fan bracket, front and side IR assembly, safety cable)	S/A, fan bracket	505-1856-xx
N/A	Fastener kit	Nacho fastener kit	505-1860-xx
	Bottom enclosure (Includes elevator assembly, leveling foot assembly and rubber foot)	S/A bottom, LP600	505-1862-xx
	Exhaust bezel	S/A bezel vent, exhaust	505-1864-xx

Part Illustration	Part name in service guide	Part name in parts pricing list	Part number
	Intake bezel	S/A bezel vent, intake	505-1865-xx
	Front bezel	S/A bezel trim	505-1866-xx
	Power supply	Power Supply Assy Nacho	510-1842-xx
	Controller ECA	ECA, Cntrllr, Nacho	510-2083-xx
	I/O ECA	ECA, Nacho I/O	510-1850-xx
	Color wheel assembly	SA, colorwheel, Nacho, Service	525-0139-xx
	Optical engine	Assy, engine, LP600	530-0179-xx

Part Illustration	Part name in service guide	Part name in parts pricing list	Part number
	Top enclosure (Includes keypad, keypad/LCD ECA, speaker, heat shield, LCD EMI shield, elevator button and spring, rear IR window)	S/A, Enclosure, Top	505-1852-xx
	Zoom ring	S/A ring, zoom	505-1863-xx
	Lamp blower	S/A, blower, lamp, with wire	526-0197-xx

Illustrated User Replaceable Parts List

Below is a list of replaceable parts (URPs). It includes the part name as used in this service guide, as well as the part name as listed in the parts pricing list database. The names often differ.

NOTE Before you order a part, make sure that you confirm the correct part number in the online parts list for the projector you are working on.

Part Illustration	Part name in service guide	Part name in parts pricing list	Part number
	Lamp door	Shield, door lamp	330-1115-xx
	Lens cap (does not include tether)	Cap, lens, LP600	505-1853-xx
	Rubber foot		328-0190-xx
	Focus ring	S/A focus ring	505-1873-xx
	Focus ring trim	S/A ring, focus cosmetic	505-1876-xx
	Lamp	Replacement lamp, Nacho	SP-LAMP-019

Labels

Below is a list of labels available for this projector, as well as illustrations showing the label locations.

Part Illustration	Part name in service guide	Part number
C170 model label	LABEL,MODEL,C170	020-2220-xx
C170 top label	LABEL,TOP,C170	020-2221-xx
C170 front label	LABEL, FRONT, C170, ASKPROXIMA	020-2230-xx
C170 I/O label	LABEL, I/O, C170	020-2234-xx
C170 model label	LABEL, CERT, MODEL, C170	020-2239-xx
C170 certification label	LABEL, CERT, C170	020-2240-xx
C170 front label	LABEL, FRONT, C170	020-2241-xx
LP600 top label	LABEL, TOP, INFOCUS	020-1591-xx
LP600 certification label	LABEL, CERTIFICATION LP600	020-2159-xx
LP600 model label	LABEL, PRODUCT ID (MODEL) LP600	020-2168-xx